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OF

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FOR THE YEAR ENDING NOVEMBER 30, 1923.

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Year Book

The Academy of Natural Sciences

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1923

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UPPER.—View of Korok Fiord and Glacier from Narsarsuk.
LOWER.—Ilimausak Mountain Across the Tunugdliarfik Fiord.

Special Reports by Members of the Scientific Staff

THE SECOND VAUX–ACADEMY MINERALOGICAL EXPEDITION: THE JULIANEHAAB DISTRICT OF GREENLAND

BY SAMUEL G. GORDON

The many expeditions of the past have done much to reveal the geology of the land bordering the inland ice of Greenland. Of exceptional interest is the Julianehaab district, between Cape Desolation and Cape Farewell, where are situated the Igaliko and Ilimausak batholiths, which present unusual geological features, as well as affording many rare minerals.

Through the courtesy of the Danish Government, and the Pennsylvania Salt Company, the Academy was enabled, during the past year, to send the writer to the Julianehaab district of Greenland for the purpose of collecting minerals. For some time previous to leaving America, active preparation was made to secure an adequate outfit—camping equipment, tent, food, tools, and gasoline. The food was packed in tin cases which fitted snugly into wooden boxes with thumb-screw lids. Each box contained sufficient food for one week, excepting that the meat and biscuits were in separate cases, and when emptied, they were used for packing specimens. The total outfit of 29 cases was shipped to England early in June, and there transferred to the Norwegian steamer "Lom," Captain, Julius Mayer.

After four weeks spent in visiting the mineralogical laboratories and examining collections in Paris, Brussels, London, and Oxford, the writer joined the vessel at Newcastle-on-Tyne. On Sunday, July 1, the "Lom" left Newcastle, at 11:30 A. M. Twenty-seven hours later she passed through the Pentland Firth, between Scotland and the Shetland Islands, into the Atlantic. For several

days the sea was rough, after which it became remarkably calm, and we enjoyed fine weather. The approach to Greenland was heralded by cold winds and fog. On Sunday the sea was filled with fantastically carved masses of ice through which the "Lom" made its way slowly. The vessel finally turned southward along the margin of the pack, and thence around Cape Farewell, the position of which could only be guessed at. That night was spent in dodging great icebergs, some of which we passed so closely as to be able to hear the waves beating against their sides.

The fog persisted until Tuesday morning, when the lifting of the clouds showed us to be just off Cape Desolation (Nunarsuit). Many icebergs gleamed in the sun about the ship, contrasting brilliantly with the dark blue water of the strait, and the rugged brown mountainous coast. In the distance was Umanak, marking the approach to the Arsuk fiord, and behind it the peak of Kingnait. In the evening the "Lom" anchored in the fiord, just beyond the village of Arsuk, proceeding to Ivigtut the next morning. Close to the shore of the fiord is the famous cryolite mine, a unique pegmatite deposit composed of cryolite, cryolithionite, siderite, quartz, galena, and chalcopyrite, with secondary thomsenolite, pachnolite, gearksutite, and ralstonite.

Arrangements were made to leave immediately for Julianehaab in the Kontrollør's motor-boat, the "Else." Everything was stowed on the boat, and accompanied by a kayakman, the "Else" left at 1 P. M., Wednesday. The warm sunny weather of the inner fiord was soon replaced by the cold cloudiness of the outer fiords and skerries. The way was quite tortuous, now we passed down wide and deep fiords, elsewhere were small connecting channels passable only at high tide. Occasionally we obtained fine views of the Inland Ice, or of glaciers debouching at the heads of the fiords, which were frequently filled with great icebergs. In the evening my companions brought out a loaf of dark bread, and a kerosene stove, over which they cooked a pot of coffee; afterwards all but the steersman huddled about the boat in sleep.

At midnight the boat reached Kagsimiut, a small group of huts dimly seen clustered on the rocks. In the distance gleamed the Inland Ice, over which the sky exhibited a ruddy glow by its reflection. A pilot was now added to the already numerous crew

UPPER.—Camp at the Head of the Kangerdluarsuk.
LOWER.—Camp at the Foot of Nunasarnausak, Kangerdluarsuk.

of the boat. At eight o'clock the next morning the "Else" turned into the harbor of Julianehaab, with its 450 inhabitants, the second largest village in Greenland—a veritable metropolis.

The Julianehaab district is underlain by Precambrian granite, with an area of red sandstone with interbedded flows, presumably of Devonian age. Intrusive in these basement rocks are two large nepheline-syenite batholiths. The northern one, cut by the Korok fiord, consists of foyaite with a margin of augite-syenite, in which is situated the mineral locality Narsarsuk. Thirty-five kilometers to the southwestward is the Ilimausak batholith, cut by the Tunugdliarfik and Kangerdluarsuk fiords. Remnants of the roof of the batholith exist as caps on Ilimausak and the Hatten. The nepheline-syenitic magma differentiated into a series of rare rocks, which form a stratified complex, beautifully exposed along the fiords. On the north side of Tunugdliarfik, this series comprises from the bottom upward: lujavrite, naujaite, sodalite-foyaite, pulaskite, quartz-syenite, and arfvedsonite-granite. At the head of the Kangerdluarsuk, a similar series is revealed; and in addition another type, the kakortokites, exposed as a series of red, black, and white bands on the plateau of Kringlerne. Many pegmatites of aegirite, arfvedsonite, feldspar, nephelite, eudialyte, rinkite, sodalite, and steenstrupine, occur in the naujaite.

It was planned to establish the first camp at the head of the Kangerdluarsuk; a later one on the plateau of Narsarsuk; followed by camps at various points on the Tunugdliarfik.

Late in the afternoon of July 14th, we reached the head of the Kangerdluarsuk, a magnificent amphitheatre which has been likened to the Monzoni in the Tyrol. A camp site was selected on the north side of the fiord, near a brook. Directly opposite, in the east, was the serrated mountain Kidtlavat—The Comb, behind the lower Laxefaeld. Southward were the twin peaks of Iviangusat rising above the plateau of Kringlerne. Grayish slopes formed the northern part of the fiord, while in the northwest, behind the camp, the side of Nunasarnausak rose precipitously above the water. In the vicinity of the camp was a scanty vegetation consisting of copses of dwarf birch (*Betula nana*), and willow (*Salix glauca*), with blooms of the arctic poppy (*Papaver nudicaule*), the blue willow herb (*Chamaenerion latifolium*), and the yellow saxifrage (*Leptasea aizoides*).

The writer's staff consisted of two loyal Greenlanders: Peter Hansen of Arsuk, the interpreter, and John Kielsen, of Julianehaab, the kayakman. John furnished the camp with salmon from the Laxe Elv, and halibut from the fiord, which he skillfully caught with a two-pronged spear. It was decided to begin work the first day on Kekertausak, a small island near the western shore, about a kilometer from the camp. At 5:30 A. M., the camp was up and stirring about. The clouds were hanging close to the sides of Kidtlavat and Iviangusat, but the sun was already well up in the sky. After breakfast—oatmeal, pan-cakes, biscuits, and coffee, the tools were placed in the boat, and we slowly rowed down the fiord.

The shore of the island is formed of low, grayish-green cliffs of naujaite, a beautiful, variegated coarse-grained rock, composed of large crystals of black arfvedsonite, greenish orthoclase and nepheline, and reddish eudialyte, all enclosing great numbers of small sodalite crystals. The low tide revealed a prolific growth of seaweeds in which were many mussels (*Mytilus edulis*), and small gastropods (*Littorina rudis*, and *L. palliata*). The rocks were encrusted with barnacles, while in the clear waters of the Kangerdluarsuk, many jellyfishes were swimming about. On the south side of the island is a pegmatite, best exposed at low tide. Work was immediately begun on the vein with sledge hammers, revealing crystals of arfvedsonite, eudialyte, nephelite, aegirite, rinkite, and natrolite. Late in the afternoon John returned from the Laxe Elv on the opposite side of the fiord with fourteen salmon. Evening presented a scene of great calm. The setting sun lit up the peaks of Kidtlavat and Iviangusat. All was still, save the rushing waters of the brook and the occasional boom of two stranded icebergs, as they broke up under the influence of the waves and tide.

In the days that followed, the operations were transferred to the pegmatite veins in the shore cliffs northwest of the Lille Elv, and the steep talus slopes (screes) between the Lille Elv and Nunasarnausak, where much steenstrupine and eudialyte were obtained. The weather continued remarkably fine and clear; there were many days without a cloud in the sky. The only annoyance were the myriads of mosquitoes and small flies, necessitating wearing head nets most of the time. Excursions were made up the Lille Elv and the Laxe Elv; to Niakornarsuk, and Iviangusat. At the end of

three weeks our finds were carefully packed in moss preparatory to moving. On August 1st, Dr. Erik Bay-Schmith arrived in his motor-boat, the "Poul-Erik," and we left for Igaliko. At Julianehaab, the next day, everything was transferred to the motor-boat "Bjørn." Soon after turning into the Igaliko fiord, several whales were met, rather alarming the Greenlanders by their antics as they swam in front of the boat. Occasionally a seal bobbed its head above the water.

Late in the afternoon, Igaliko, the garden spot of Greenland, was reached. Most of the population, numbering about seventy, were engaged in haymaking in the tiny fields in front of the sandstone cliffs. The houses are low stone structures, with flat roofs often covered with luxurious growths of daisies. A small herd of cows completed a picture, most unusual for Greenland, and to be found duplicated only at Narsak. Many old Norse ruins can be seen in this vicinity. Twenty-two men and women were engaged to carry the equipment and supplies to Narsarsuk, about eight kilometers to the north. The boxes were slung on their backs, and carried by means of tump lines. From the head of the fiord the route lay northward across a gravelly alluvial plain, traversed by a small river. About five kilometers from Igaliko, an escarpment 300 meters high is reached, on top of which, near the foot of Igdlerfigsalik, Narsarsuk is situated.

The tents were pitched between high rocks, close to the site of the proposed excavations. While the coast of Greenland has a barren and forbidding aspect, the high rugged mountains of the interior, the wide and deep fiords, the glaciers at their heads, and the Inland Ice, present magnificent vistas that truly beggar description. To the southward of the camp could be discerned Igaliko, nestling in front of the red sandstone cliffs near the head of the Igaliko fiord, directly opposite the dark mountainous mass of Iganek. Just to the north a field of huge icebergs marked the junction of the Korok fiord to the Tunugdliarfik. Their source, the Korok glacier, was but a short distance away. Below the camp was the wide, blue Tunugdliarfik, whose sinuous course could be seen from Brattahlid, the site of the farm of Erik the Red (discoverer of Greenland), past the reddish palisades of Musartut, to the distant Ilimausak. Farther to the west was the Sermilik

glacier and the Inland Ice, beyond which the sun would set, its last rays reddening the peaks of Igdlerfigsalik behind the camp. The Igaliko batholith is a large body of nepheline-syenite, forming an intrusive mass in Precambrian and Devonian sandstone. At the western margin is an area of augite-syenite, a barren, gravelly plateau—Narsarsuk. Numerous coarse pegmatites of aegirite and feldspar occur in the augite-syenite, often containing small cavities, lined with rare minerals. Such cavities may occur also in the augite-syenite.

The operations at Narsarsuk consisted of digging holes and trenches over the small area in which the rare minerals occur. Some fifty holes were dug by the staff, augmented to eight Greenlanders, exposing about sixteen small pockets which produced a variety of minerals including albite, orthoclase, aegirite, epididymite, catapleiite, parisite, ancylite, elpidite, zircon, natrolite, astrophyllite, taeniolite, chalcolamprite, crocidolite, and quartz.

Fresh salmon and halibut were brought daily from the fiord at Igaliko. The Greenlander's diet is far from elaborate, consisting of boiled fish, black bread, and coffee which is roasted in a pan over a birch fire, and ground with a rock. On the night of August 14th a violent föhn wind began to blow. At 3 A. M. all were called out to reinforce the tents with additional rope and rocks. Toward noon of the 15th the wind abated enough to continue work.

August 20th dawned a fine, clear day, and an ascent of Igdlerfigsalik was decided upon. Accompanied by a Greenlander, Andres Egede of Igaliko, the writer left the camp at 7:40 A. M. The climb was an easy one, although progress was at times slow owing to the loose nature of the rocks of the slopes. The crest between the two peaks was soon reached, and at 11:15 A. M., we stood on the summit. Search was made for the records of Steenstrup and Brunn, who ascended the mountain in 1888 and 1894, but their cache could not be found.

A magnificent panorama is revealed at the summit. Far below were the fiords of Igaliko, Kangerdluarsuk, and Tunugdliarfik. In the dim distance was Davis Strait, seen from Nunarsuit (Cape Desolation) to the maze of mountains overhung with heavy clouds, behind Cape Farewell. To the eastward, the Inland Ice, a great white desert, stretched away to the distant nunataks of the east

UPPER.—Junction of Korok and Tunugdliarfik Fiords.
LOWER.—Camp at Naujakasik, Tunugdliarfik.

UPPER.—Junction of Korok and Tunugdliarfik Fiords.
LOWER.—The Tunugdliarfik from Naujakasik; Igdlerfigsalik in the Distance.

coast of Greenland. To the north and west, the Inland Ice sends glaciers into the Korok and Sermilik fiords, which are filled with many icebergs. In the southwest the mountains Kidtlavat, Nunasarnausak, Nunasarnak, and Ilimausak, appeared as bluish masses in the haze of the noon sun. At 1:40 P. M., we left the summit, reaching the camp at 4 o'clock.

On August 23rd, twenty men and women arrived to carry the equipment and the boxes of food and specimens to the foot of the plateau, preparatory to moving to Tupersuatsiak, thirty kilometers to the southwest. The staff was reduced to three Greenlanders, Peter Hansen, Jakob Egede, and Henderik Egede, kayakman. At ten o'clock we departed, three women and three men rowing. The trip was leisurely made, and was enlivened by the songs of the Greenlanders, as they slowly rowed down the fiord. The cliffs rise precipitously above the smooth waters of the Tunugdliarfik. The ledges and terraces are carpeted with a heath of juniper (*Juniperus sibirica*), blueberry (*Vaccinium uliginosum*), and crowberry (*Empetrum nigrum*), with occasional copses of willow and birch. In the afternoon a short stop was made for lunch, which, for the Greenlanders, consisted of a small dried fish similar to a smelt: sodde (*Mallotus villosus*), and blueberries. On the way, Henderik shot several ducks.

Late in the afternoon the tents were set up at Tupersuatsiak, close to the bay. Many horizontal pegmatites are exposed in the naujaite cliffs, and these produced crystals of aenigmatite and arfvedsonite. Ptarmigans were very abundant; on one occasion Henderik shot thirteen. Stewed ptarmigan with fried sweet potatoes (canned), huckleberries and cream, biscuits and tea, proved a delicious repast at the end of the day, and a welcome change from halibut and salmon.

On August 26th, a row boat with four women and one man (the steerer) arrived from Narsak, and the camp was moved to Naujakasik farther down the fiord. An excursion was made to South Siorarsuit, where albite and ilvaite occur. The talus slopes below the cliffs of Naujakasik afforded many crystals of eudialyte, steenstrupine, and schizolite, and a few specimens of dahllite and britholite. On the 26th, it began to rain in the evening, after forty days of fine, clear weather. A Greenlander from Narsak brought us a

large redfish (*Sebastes marinus*), a species living in the great depths of the fiord, and which, once it accidently gets to the surface, cannot return.

The camp at Naujakasik presented a fine view of the eight kilometer section of the Ilimausak batholith. The different layers, lujavrite, naujaite, sodalite-foyaite, and arfvedsonite-granite, and the roof-remnants of porphyry could be very distinctly seen across the fiord. At Tugtup Agtakorfia, the large blocks of naujaite in lujavrite presented a striking appearance. Thirty-five kilometers to the north, Igdlerfigsalik marked the site of the Igaliko batholith.

After several days at Naujakasik, the tents were moved across the fiord to Nunarsuatsiak, a small hill at the foot of Ilimausak. On top of the hill is a very coarse pegmatite with large crystals of arfvedsonite. Along the shore cliffs is a vein of aegirite and natrolite containing many yellow crystals of "erikite," a mixture of monazite and hydronephelite.

It continued to rain until the end of the month. One night a row boat, accompanied by two kayaks, passed up the fiord on a fishing trip, returning late the next night. On September 2nd, the camp was again moved to Tugtup Agtakorfia. A cold wind was blowing from the west, with occasional showers. Search was made along the shore of Igdlunguak for steenstrupine and natrolite.

In the afternoon of September 3rd, the Kaleralik arrived to take us back to Julianehaab. The tents were rolled up for the last time, and at 6 P. M., we left for Narsak. As we passed down the fiord the mountains bulked hugely above the water as dark shadowy masses. In the distance, Igdlerfigsalik, now covered with snow, glowed under the setting sun. In the evening we reached Narsak, a picturesque village lying at the foot of Ilimausak, the two peaks of which are separated by the Narsak glacier. On September 5th, the writer left Julianehaab on the S. S. "Gautatyr," arriving at Ivigtut the next morning. From Ivigtut an excursion was made to the glacier at the head of the Arsuk fiord, in the motor-boat "Tertia," accompanied by Engeniør Sven Oscar Corp, and Doctor Skat Illum. A stop was made at Ekaluit, to gather specimens from the nepheline-syenite dike. At many points rills and waterfalls coursed down the precipitous walls of the fiord. The blueberry leaves were now assuming a scarlet hue, vividly coloring

the patches of vegetation on the ledges of the cliffs. About noon the "Tertia" anchored in the lee of the glacier, which presented a blue wall about 20 meters high. From a moraine at the side we could climb up to the surface to photograph the seracs.

Another excursion was made one evening to the village of Arsuk, at the foot of Kingnait, to see the dances. The sun was disappearing behind Umanak when we arrived. The dancing was held in a small, low room. The wooden bed had been folded against the wall, and in the recess thus formed, an inconceivably dirty infant lay against the bedding. A single candle hung from the ceiling, while on the window sill, a blubber lamp glowed feebly. The room was crowded with Greenlanders stepping picturesque old Danish folk dances. The dancing included much stamping and shuffling of the feet, and clapping of the hands, as they whirled about, now forming interweaving circles, then breaking into couples or groups of three, to the spirited and infectious rhythm of music skillfully played on a concertina.

About midnight we returned to the "Tertia." The night was cold and the sky clear, with here and there a greenish northern light. The motor boat left a phosphorescent wake as it chugged rapidly towards Ivigtut. With the beginning of September, the northern lights (*Aurora borealis*) became a nightly occurrence, usually seen as slowly moving, long, greenish clouds, and occasionally as rapidly moving curtains of greenish, orange, pink, and reddish streamers. The mountains about the fiord abound in ptarmigan, arctic hare and fox. A hunting trip of the Arsuk men to the Sermiliarsuk fiord resulted in the killing of twenty-five reindeer, which proved a delightful addition to the Ivigtut larder. At the end of October, thin ice began to form in the fiords.

On October 24th, the Norwegian steamer "Skulda," Captain R. Petersen, arrived for a load of cryolite for Philadelphia. The equipment, and thirty cases of specimens were stowed on board, and on October 28th, at 6 A. M. the "Skulda" weighed anchor. A short stop was made at Halifax for coal, and on November 11th, we passed up the Delaware, marking the end of an exceptionally interesting and profitable trip.

In conclusion, the writer desires to express his appreciation and thanks to the following for their kind courtesies and aid: the

Danish Government; the Pennsylvania Salt Company; the Cryolith Mine-og Handels Selskabet of Copenhagen, and their officials at Ivigtut: Messrs. N. Jagt, E. Stenør, Mr. and Mrs. Robert Larsen; Kontrollør Aage Essemann, of Ivigtut; Mr. and Mrs. O. Hastrup of Julianehaab, Dr. and Mrs. Erik Bay-Schmith; Captain J. Mayer of the "Lom;" and Captain R. Petersen of the "Skulda." His indebtedness to the Greenlanders for the success of the expedition is heartily acknowledged.

HAWAII AND ITS FISHES

BY HENRY W. FOWLER

With the grant of a Bishop Museum Fellowship in Yale University, I was fortunately able to visit Honolulu. Arriving at Diamond Head September 12, 1922, and remaining until January 17, 1923, I had an opportunity to see something of the Hawaiian fish fauna.

From the times of the earliest voyagers to the present day, visitors to the tropical waters of the Pacific have all been impressed with the extraordinary colors of the fishes, and the visitor to Hawaii will find that their accounts have in no way been exaggerated. No brush, nor print, has yet fully portrayed their remarkable brilliancy.

Wandering through the markets of Honolulu, one finds quantities of fresh fish displayed each day. Early in the morning, or as the boats arrive, the catch is wheeled on to the wharves in hand trucks. Often later on, tardy cargoes are brought in, even until well toward noon, so that it may be necessary to visit the markets several times in order to see the entire day's catch. The smaller fish are carried about in bulk in the various containers, but the larger are carefully packed with the heads pointing all one way. Frequently great quantities of *aku* may be seen on the trucks, their slender tails all projecting above the containers like so many forks.

The large fish, like the *aú* (spear fish), *mahihi* (dolphin), *ahi* (albacore), *ono* (peto), *omilu* and *pauu ú* (crevalley) are butchered. Great steaks, or slabs, may be seen about the various stalls, while

UPPER.—Reef at Diamond Head.
LOWER.—Beach at Laie.

here and there we meet with a large fish entire. Medium or small sized fish are always displayed intact. The stoic-visaged Japanese, or Chinese, generally have their goods arranged to particular advantage. They frequently place them in series according to the size of the individuals. In passing along from stall to stall we find great quantities of certain species almost every day, while others are not only infrequent, but may occur only at rare intervals of months, or even years. It is therefore very seldom ever possible to find an unusual or exceptional fish on successive days.

If one should make a selection for purchase, the fish are thrown on the scales, sold by the pound and number, and at a high price. In the cheaper grades this runs from 15 to 25 cents a pound, and in the higher grades, to 50 or 60 cents. This fluctuates according to the supply. When few boats come in, and the fish are scarce, the price rises higher than usual. Should great catches be made, and the market glutted, the prices fall. It seemed to me the price was never the same for any particular kind of fish, and the transaction usually an argument, if not a battle. These consequent wranglings—sometimes in the babel of several languages, often added to the confusion and general noise of the market. One may even hear vehement profanity in English and from indications it frequently appeared to be used in other languages as well.

Sometimes the sellers would yell out the native names of their fish in high sustained tones. Others simply grunted about them. One often noticed coins, such as silver dollars, half-dollars, quarters, etc., piled along the edges of the counter in front of the seller. These would naturally become wet from the cold, or iced, water, sprinkled on the fish to keep them fresh. In making change the seller would invariably pick up such of the top coins as were necesary, and rub them up and down the front of his clothes to dry them before handing them to the purchaser.

The fish are always wrapped up in the bright green leaves of the *ki* plant. The leaves are oblong in shape, and a foot or more in length. A part of the stem is left with each leaf, so that the package may readily be wrapped tightly, and the leaves seldom work loose. Large fish, or larger packages of small fish, are often wrapped in several leaves. On the outside, paper is always used to finish the package.

Most Oriental peoples eat raw fish, and I frequently saw Chinese or Japanese women ask for a small slice of a preferred fish as a sample. After eating it raw as they stood in front of the counter, they would then order such as they desired. Frequently dishes of raw fish flesh, chopped or sliced in various ways and garnished with greens, or other delicacies, were displayed about the stalls.

In many ways the fish stalls are similar to one another, and are presided over by one to several sellers. They always consist of a flat counter, inclined slightly for drainage, with a gutter on the inside. The fish are piled along as closely as possible, and with as much advantage as may be had for display. The brilliant colors and great variety of the catches render it necessary to visit all the stalls and make a careful examination to get a good choice of material. Frequently it may be necessary to pass a number of stalls until the desired species can be found.

Fish with red or pink colors are most in demand. This is due to various traditions, likely among the Japanese for their veneration of the *tai*, or red porgy, of Japan. The *alalaua* and its allies (catalufas) were held in regard by the Hawaiians for their supposed occurrence when a chief died. Other brilliant red, or rosy fishes, sometimes very abundant, produced an appearance in the stalls, as if bloody and gory in the extreme. Thousands of small *pauu ú u*, *alaihi* (squirrel fishes); *kumu*, *moano*, *nunu*, *weke ula* (goat fishes), produce a display not easily forgotten. The splendid large *ulaula* (snappers), with their long graceful bodies, and plume-like tails, are among the finest of the Hawaiian fishes. The more bass-like *ukikiki*, rosy, with transverse yellow cross-bands, is equally excellent, and was dedicated to the late President Roosevelt. Of later years, owing to deep-water methods of fishing, the rosy *oopu kai noahu*, a long-nosed sculpin, comes frequently to the market. Though less conspicuous in their sombre colors, the fine large snappers known as *opakapaka* and *uku*, and the runner, easily ranks among the best food fish. Several beautiful cirrhitids, as the *pili ko'' a*, *hilupilikoa*, and the *po' opaa'*, are among the most richly colored of the smaller fishes. Very rarely the black-banded *kikakapu*, perhaps more distinctly Hawaiian than any other fish, may be found. Many species of the beautiful butterfly-fishes, or *kihikihi*, form a riot of yellow and white. A long-beaked species (*For-*

cipiger longirostris) was the first fish recorded from Hawaii, having been described as early as 1782.

Among the eels various congers, or *puhi uha*, are abundant. *Puhi laumili* is a most variable and abundant speckled moray, with a mouth of formidable teeth, vicious and pugnacious in the extreme. Great long, silver and dark green, bill-fish, or *aha aha*, are occasionally brought in. The *mé' emé' e*, or *iheihe* (half-beak), and *puhiki'i*, abundant in great silvery shoals off Diamond Head, are often brought with other small species.

It is among those known as the wrasse-fishes that we find the most brilliant of all Hawaiian fishes. They are usually of large size, and while often not shapely, their weird combinations of greens, pinks, blues, reds, scarlets, yellows, etc., are striking. The large brilliant yellow *a' awa* (*Lepidaplois*), and sometimes its darker or more purple ally, are usually frequent and constant. Then there are the deep-violet and green *hinalea iiwi*, the white-dotted *opule*, the green *hou*, and the *hinalea lolo*, a most gorgeous deep red or violet, sprinkled with azure dots. Others are the pale blue *úhu*, and the rosy *hilu*, among the larger species. Most of the parrot fishes are more sombre browns, or dark dull red, the large *uhu uli uli*, with its green and blue, is frequent.

Among the herring-like fishes, the *awa* (ten-pounder), *oio* (lady fish), and *awa-awa* (milk fish) are large staple fishes of fine quality. The *awa-awa*, and the *ama-ama* (mullet) have long been kept in the famous fish-ponds, some of which are still extant. These ponds were usually built by fencing the indentures along the shores. They were also constructed in the interior, and filled with fresh water from the mountain streams, or tidal waters flowed through ditches.

I was so fortunate as to spend a weekend at Dr. C. Montague Cooke's summer home near Laie, in early November, where some knowledge of the littoral fish fauna could be obtained. Visiting the small island by wading the narrow channel at low tide we had ample opportunity to see several very interesting conditions. The water was about up to our knees, and the bottom was beautifully carpeted with corallines, sponges, various seaweeds, sea lettuce, burrowing anemones, etc.

The island is of especial interest as it presents three very distinct

natural conditions. The eastern shore is shelved as a fine reef; the north shore is abrupt with many interesting lava terraces; while the west shore slopes gradually as a fine sandy beach. All along the reef were holes and the spray and swell, sweeping over, would carry in scores of small reef-loving fishes (*Hepatus triostegus*, *Abudefduf imparipennis*, young *Sphyraena*, dark tangs, labroids, gobies, etc.). In the lava pools of the north slope blennies (*Salarias zebra*) were found leaping from pool to pool, easily jumping three or four feet, like grasshoppers rather than fish. In their capture an effective method was to place a hand net at the lower end of the pool, then drive the fish down by wading, when they would jump into the net in their efforts to escape toward the sea. These blennies were very abundant, jumping about in all directions. Large grapsoid crabs clambered over the lava rocks, along the ledges of the reefs, and among the lava pools. These lava pools were of various levels, from where the sea breaks in great waves, throwing the spray twenty to thirty feet all about the rocks. The lava rocks are very rough, sharp, jagged and irregular, thus forming many difficulties for one moving over them. Their sharp edges easily cut or rasp shoe-leather and cause serious cuts or lacerations to exposed limbs.

Returning by way of the southwest beach we found a large flock of about one hundred golden plover. They were spread about the rocky shoals. Some of the birds were feeding, others standing motionless, like wooden decoys in the falling gloom. On the beach we noticed quantities of shells, mostly small clams, limpets, cowries, etc.

Next day we went to the beach on the mainland in the early morning, and scooped up buckets of sand. By carefully searching this sand very slowly, taking a small pinch in our fingers at a time, some minute transparent fishes were found. These afterwards proved to be an interesting new form (*Crystallodydes cookei*) belonging to a family hitherto not known from Hawaii. My companions seined the shore, and found green and red *Cheilio*, young *Kyphosus*, *Spheroides*, *Mugil*, *Spratelloides*, and *Abudefduf*. All these were in the sea weed and but few were taken at one haul. Along the beach were scattered a few Portuguese men-of-war, apparently foundered by tide and wind. In the estuary of Laie Stream, in

quite fresh water, quantities of *Gobius*, *Eleotris*, *Awaous*, *Polydactylus*, *Kuhlia*, and a few young *Caranx* were found.

A visit to Hawaii and a study of its brilliant fishes, however, cannot be complete without visiting the Bishop Museum to see its unexcelled collection of casts. These have been perfected, over 500 in all, through the labors of Mr. John W. Thompson during the past twenty years. All the more abundant species of the islands are represented, besides others rare, or unusual. Mr. Thompson has combined rare skill in casting with remarkable accuracy in coloring. It is therefore now possible for the visitor to obtain here an excellent conception of the extraordinary range of design and brilliant colors of the richest fish-fauna of the globe, and it is safe to say one cannot find such an exhibition in any other museum.

One cannot have had the glimpse of Hawaii and its fishes, here so briefly described, without hoping to have another and larger acquaintance with it, and as we sailed out of Honolulu, leaving many kind friends behind, we cast our leis on the sea in pledge of a return on another day.

AN ENTOMOLOGIST'S SUMMER VISIT TO JAMAICA AND COSTA RICA

BY JAMES A. G. REHN

On July 11, 1923, I left New York on the "Tivives" of the United Fruit Company, bound for Jamaica. My purpose was to do entomological field collecting for the Academy for about three weeks in the eastern part of that island, chiefly in the higher Blue Mountain district, and then move on to Costa Rica for preliminary reconnaissance work in that most interesting country.

The particular object in the Jamaican work was to secure information on the Orthoptera, or that group of insects comprising the earwigs, cockroaches, mantids, walking-sticks, grasshoppers, katydids, and crickets, found in the Blue Mountains, a region previously unstudied from the standpoint of the Orthoptera. The chief reason for this work was that, with my colleague at the

Academy, Mr. Morgan Hebard, I have been engaged for some years in a comprehensive study of the Orthoptera of the West Indies, from the standpoints of systematic relationship, distribution and origin. The more elevated regions of these islands frequently are inhabited by forms differing from those of the lowlands, and shedding much light on the origin of the fauna of the West Indies, incidentally furnishing important evidence bearing on the much-discussed geological history of the Antilles. In a few words the old, old question, "Whence and how did the West Indies receive their animal life?" was responsible for the work.

The Costa Rican work was occasioned by a desire to get first-hand information on Orthoptera conditions in a region generally familiar to me from past laboratory studies, but with which I had no personal acquaintance. Costa Rica had been selected for intensive work in this subject a number of years ago, as a tropical country of limited area, highly diverse conditions and with a good basis for work in the past studies of quite a few investigators, while a number of earnest and enthusiastic colleagues in that progressive country furnished additional incentive. The past season's plan was to enable me to lay the groundwork for more detailed field studies in that country in the near future.

The early morning of July 16 found us in the lee of the blue and purple shadowed mountains of Jamaica, and as the sun rose we dropped anchor off Port Royal for quarantine inspection. Thanks to the courtesy of His Excellency the Governor of Jamaica my baggage was passed through the customs without delay.

Through the kind assistance of the American Consul, Hon. C. L. Latham, it was possible for me to be most comfortably and hospitably installed at Pleasant Hill House, a coffee plantation at thirty-six hundred feet elevation in the Blue Mountains. Here, through the kindness of my host and hostess, Mr. and Mrs. W. H. Landale, I was able to make regular excursions in various directions—down hill to the valley of the Yallahs River, into the coffee and small banana patches of the estate, into the "ruinate" or waste land once cultivated and now abandoned, and, most important, to the forest of the higher mountains.

Pleasant Hill House stands on a shoulder of a side ridge jutting from the main crest of the Blue Mountains; on another shoulder of the same ridge, to the east and thirteen hundred feet higher, is the famous botanical station of Cinchona or the "Hill Garden," which has figured so prominently in the study of the botany, scientific and economic, of Jamaica. A thousand feet below Pleasant Hill lies the bed of the Yallahs River, the deep valley of which stretches away to the south toward the Caribbean. West of Pleasant Hill, across the Yallahs, towers the Port Royal Range, culminating in Catherine's Peak (5048 feet), while to the northwest Silver Hill Gap marks the division of this range from the main Blue Mountain chain. Directly north of Pleasant Hill the main ridge rises in the rough dome of John Crow Peak (6000 feet), to the east of which, at the head of the Clyde River, a tributary of the Yallahs, is Morce's Gap (4980 feet). The latter is a classic locality in Jamaican botanical literature, as Shreve used it for one of his most important observation stations in his monographic studies of the physiological aspects of the forests of the higher Blue Mountains.

To the east of Pleasant Hill the side ridge on which it is situated rises rather steeply about a thousand feet and effectually cuts off the view of the higher of the Blue Mountain peaks, that is Sir John Peter Grant Peak (6200 feet), Mossman's Peak (6900 feet), and Blue Mountain Peak (7428 feet). These elevations are, however, visible from St. Helen's Gap, a saddle in the side ridge near Cinchona, and one of my regular working points.

The panorama from Pleasant Hill is a most remarkable one, and it is often hard to realize that you are but eighteen miles by mule trail and road from the hot streets and noisy markets of Kingston.

The trade wind almost steadily bathes the opposite (windward) side of the range with fog, and in the morning this usually clothes all the higher parts, frequently reaching down to at least forty-seven hundred feet elevation. Through Morce's Gap and others in the main range the fog often pours steadily all day from the northeast, usually being dissipated very promptly by the warm sunshine of the drier leeward side of the island.

The fog, and indirectly the trade winds, are responsible for marked differences in the forest types of the mountains, as Shreve has very fully shown in his admirable studies. The slopes regularly

bathed in fog and the areas about the gaps or passes show a far greater development of striking tree ferns and parasitic or tree inhabiting plant growth, such as bromeliads, orchids and mosses, than the drier leeward slopes. The forest cover of the fog-bathed areas is denser and more tangled than on the other slopes, while the loading of the trees with epiphytic plants is so great that at times the mosses and other forms are in solid mats, while the large bromeliads are everywhere in evidence. The hanging, rope-like lianes festoon many of the trees, while the most conspicuous and beautiful features of this part of the forest are naturally the tree ferns, which are often ten feet or more high.

The drier leeward slope forests are more open, with far fewer of the epiphytic plant forms and a marked resemblance to the forests of a more temperate clime.

No palms are found in this mountain forest and on both slopes one of the commonest trees is an arborescent huckleberry or bilberry (*Vaccinium meridionale*), growing as high as twenty feet, the fruit of which often furnished me a field lunch. As a whole the forest trees are of but medium height, virtually none over sixty feet high, the average outside of the ravines being about twenty feet.

The forested area of the higher Blue Mountains is held as Crown Land as a source of water supply. In the general region examined by me the forest cover is fairly uniform down to about forty-four hundred feet elevation, except for restricted areas of old cultivation now gone to "ruinate."

But a short distance up the hillside above Pleasant Hill the forest is entered, and in this vicinity and from there to St. Helen's Gap (4780 feet), and then to Morce's Gap in the main ridge (4980 feet), a distance by trail of five miles from Pleasant Hill, I worked daily. Beating vegetation, shaking flowers, peeling dead bark, digging into stumps, dead logs and old termites' nests, turning stones, digging into loose soil, dismantling dead tree ferns and similar vegetation and painstaking dissection of bromeliads for hidden Orthoptera, fully occupied my days. Along the trail side in the open stretches results were poor, except that a new species of grasshopper representing a genus previously known only from Cuba was secured. Found at first only in an immature condition, persistent search day after day finally rewarded me with a single adult specimen.

In the forest the trail side was in places enlivened by great patches of wild ginger (*Renealmia*) then in full bloom, the large flower clusters made up of pale orange-yellow blossoms. The mountain trails were largely in good condition and except for the frequent steepness of the slopes travelling was not at all difficult. As the windward side of the island was approached on the Morce's Gap trail the epiphytic *Tillandsia*, a first cousin of the Spanish moss of our southern states, and the bromeliads became more noticeable, while the tree ferns were progressively more numerous.

The scarcity of insect life in the mountain forest was one of its most remarkable features, the usual abundance of individuals, as well as species, noticed in more tropical humid regions being entirely lacking. The secretive habits of many of the insects for which my visit was made rendered the work anything but spectacular, yet it had its thrills and unexpected experiences. Pulling water laden bromeliads from tree branches over one's head frequently resulted in surprisingly cold shower baths, but the subsequent careful examination of the bromeliad sometimes brought to light a cockroach or a cricket new to the island or to science. Tucked down among the leaf bases of these first cousins of the pineapple lives an animal world of curious character and astonishing variety. To secure information on the Orthoptera in these situations was one of the main things in my work, and in this I was eminently successful, as a number of species and quite a few genera were added to our knowledge as Jamaican forms, while a surprising number were new to science.

Evidence was secured showing the ancient relationship of the Jamaican mountain fauna with that of similar areas in the other Greater Antilles, while on the other hand the close relationship of mountain species with others of the lower portions of Jamaica was demonstrated. The latter evidence would indicate that the lowland fauna of geologically more recent land probably has been derived from a more ancient one, now represented in the far older mountains.

In the mountain forest the Jamaican solitaire was frequently seen and heard, a shy gray bird with a chestnut throat and white spot near the eye. The little Jamaican tody, whose green head and back and crimson throat is quite conspicuous, belongs to a pecu-

liarly Greater Antillean family of birds, and was noticed more than once along the trails. The white-headed pigeon, the cashew bird (*Spindalis*), the Jamaican mocker, the Jamaican woodpecker, several species of humming birds, and numerous other forms of bird life were noticed in the forest.

After rains or fog drenchings large land snails appeared like magic and paraded across the trails, disappearing as the sun shone and the temperature rose.

A trip was made to the slopes of Sir John Peter Grant Peak (summit elevation 6200 feet) to ascertain whether elevations about fifty-five hundred feet showed differences in their Orthoptera from the regions between forty-four hundred and five thousand feet, which I had more intensively studied. To make the trip it was necessary to have a negro armed with a "cutlass" open an old trail for at least five miles, as the sapling growth and climbing bamboo and bracken completely choked the old trail, untravelled for years. We reached a point at fifty-eight hundred feet elevation, relatively near to the main peak, where the trail completely disappeared and further progress in the dense, choked and matted forest growth meant cutting an entirely new trail, a task for a gang of fresh men. Work at this point, at New Haven Gap at fifty-six hundred feet, and at several other points above five thousand feet, demonstrated clearly that the Orthoptera of the forest is not altered by the greater elevation, the immediate environmental conditions being the modifying factors within the mountain forest.

The gardens at Pleasant Hill House were very beautiful, with many native and exotic trees and shrubs, a great variety in bloom, attesting the love of flowers of the Landale family. At dusk the blue lilies furnished tempting bait for hawk moths, and numerous evenings a gasoline pressure lamp was used to attract night insect forms, with fair success. Hand flash lamps aided, as usual with our work, in the night quests for insects.

The banana patches near the house were assiduously examined and the dead bracts of the clusters netted an important harvest of cockroaches of various genera, and large and striking katydids, the latter including a genus *Jamaicana* known only from the island. The bases of dead banana leaves, prostrate rotted sprouts and the humus beneath yielded rich finds after prolonged and thorough search.

On August 2 I bade goodbye to my kind hosts and started with pack animals and a coolie driver for Kingston by way of Gordontown. As we came through Content Gap in the Port Royal Range, Kingston Harbor and the Liguanea Plain spread out below like a map, and our trail zigzagged down through mango-shaded glens to the valley of Hope River and Gordontown.

A few days spent in the Liguanea Plain country and on the sea-coast near the mouth of the Hope River closed my Jamaican work. The low country in Jamaica was then passing through a period of severe drought, the soil was bone dry, the dust very great, the vegetation parched and much quite leafless. On August 6 I ran the gauntlet of importuning negro boys on the docks, managed to get my baggage safely out of their hands and on board the steamer "Carrillo," and sailed for Cristobal.

The mountains of Panama east of Cristobal, as we saw them on the morning of August 8, bore their usual lowering aspect, wreathed in dense cloud masses. We had just passed through a stiff squall of over an hour's duration, which lifted when the "Carrillo" was off the breakwaters. At four the same day I was aboard the steamer "Uloa," leaving Cristobal behind and headed for Port Limón, where the ship was due the next morning.

Port Limón, Costa Rica, or Limón as it is now officially and more generally called, is beautifully situated as seen from the sea, the towering and densely forested front ridges of the Talamancan Cordillera forming a background for the houses of the city, the cocoanut palms, the sea-wall and the beaches, which in the light of early morning all combine to make a most pleasing picture. Frigate birds and pelicans enlivened the harbor, while the black vultures or "zopilotes" were in evidence as soon as land was reached. Familiarity with the city removes some of the first impressions, but Limón is, nevertheless, an interesting city, at one time a pest-hole of fever, sewerless and generally cursed by the unfortunate traveller who had to pass through it. To-day the development of the city as the eastern entrepôt for Costa Rica has made it a modern community with all the major conveniences of larger places. The railroad from Limón extends to San José and beyond to Alajuela, and connects at San José with the Pacific Railroad, which reaches the Pacific at Puntarenas.

The Hon. J. J. Meily, American Consul at Limón, was of great assistance to me, and through his courtesy and that of United Fruit Company officials the general plans of my Costa Rican field work were soon arranged. The Government of Costa Rica had kindly granted free entry of my materials and no time was lost in the entry of baggage.

The morning of August 10 found me starting for Guápiles, a point in the Santa Clara region of Costa Rica, distinctly in the lower eastern tropical belt, but sufficiently elevated to be away from the flat lands of the coastal regions, as found to the northwest of Limón. One soon learns that while railroad fares are very low in Costa Rica, excess baggage, as in most of the world outside of the United States, is relatively expensive. My three pieces of field baggage always cost more in Costa Rica than my railroad fare, yet all combined weighed only two hundred pounds.

From Limón the train followed first the beach, then through great areas of swamp forest, most of this with the striking and impressive "swamp palm," next through stretches of the banana lands for which Costa Rica is famous and which have been so largely responsible for the development of her eastern section. Many cacao groves were noticed through this district as well as at numerous places beyond on the way to Guápiles. Cacao grows in the shade of taller trees planted to protect it from the sun. At Siquirres, I left the train, which goes on to the capital, San José, and the interior, and continued my journey over the "Linea Vieja," or "old line," on a gasoline track car. The "old line" was the initial attempt to reach San José by rail from the east coast, but it was only partially completed and abandoned on account of the difficulty of maintaining bridges over certain of the intractable rivers of the more elevated region west of Guápiles. These difficulties caused the abandonment of the project in favor of that up the valley of the Rio Reventazón, which was completed. The Reventazón is a splendid river, unruly in its own way and quite capable of doing great damage, but the railroad has to cross it but once, which is done a few miles west of Siquirres.

Guápiles lies due north of the volcano of Turrialba and somewhat northeast of that of Irazú, these two being the more eastern of the peaks of the great central volcanic chain of Costa Rica.

When the clouds would lift sufficiently the more western members of the group—Barba and even Poás—could be seen. The new crater of Irazú, which opened a relatively few years ago, is some distance down the slope from the old crater group, and on the north side of the volcano. When the peak was free from its usual mantle of clouds one could see this crater sending up great masses of steam or white vapor at regular but brief intervals. Turrialba and Barba are quiescent although the former has been in eruption in the last century, but Irazú and Poás are more active and have broken into eruption a number of times to the knowledge of man. The earthquakes which have so shockingly devastated Cartago and other communities have generally been correlated with disturbances in the central volcanic Cordillera.

Between Guápiles and the volcanoes stretch miles of gradually rising country which is covered with virtually untouched primeval forest. To work in a portion of this forest country was my major reason for using Guápiles as a base. To the north the country gradually flattens out into the Santa Clara Plains, the region of the lower courses of the Rio Parismina, the Santa Clara, the Rio Guápiles, the Rio Toro Amarillo, the Sucio, and to the west the Rio Sarapiqui, the whole a vast area little traversed and not at all well known, cut up by innumerable "caños" or connecting water courses, and covered with dense forest, grassy savannas or great swampy areas.

"El Salvador" at Guápiles, the beautiful residence estate of the district manager of the United Fruit Company, was my home for over two weeks, and the heavy forest country south of La Emilia, a cattle ranch of the Company east of Guápiles, was visited regularly. The rainy season was well along and regular drenchings were quite the order of the day's work in spite of ponchos.

The beautiful lawns, crotons, and rows of royal palms at "El Salvador" were frequented by three species of striking, yellow-breasted flycatchers, one of which would sing its explosively startling song from the veranda rail. In the palms and bread fruit trees nearby, the great montezuma yellow-tail or "oropéndola" (*Gymnostinops*) would give his wheezy music. The black anis, called "tio" from their note, would congregate in groups in the pasture, often about the cross-bred Spanish and Mysore cattle,

fully earning the name of "garrapatero" frequently given by the natives from their liking for "garrapatos" or ticks. The "zopilotes" were much in evidence and groups of the dull-colored crow *Psilorhinus*, called "pía-pía" from its discordant cries, were often encountered in the tree clumps scattered over the pasture land, as well as along the edge of the forest itself.

The great forest, the "montaña alta" of the native, was a place of never-ending interest, a mysterious world of vegetation running riot, of great trees, such as the copál (*Protium copal*), guachipelin (*Diphysa robinioides*), gavilán (*Pentaclethra filamentosa*), ceiba (*Ceiba pentandra*), surá or guayabillo (*Calypthrantes tonduzu*) and many other species, as well as a wealth of lower growth—the infinite variety of the tropical forest. The tree types in this forest are often heavily buttressed, and others have the trunk divided near the ground in a tripod-suggesting fashion. The leaf crown canopy of the forest is moderately uniform, but rifts here and there permit the sunlight to filter down, making small sunshiny patches where a different variety of undergrowth exists and a change in the insect life is soon noticed. The low trees and shrubs with broad, heavy leaves, called "lengua de vaca" (cow's-tongue) by the natives, are quite conspicuous in the lower vegetation, while the weird heliconias, called "caliguate", and occasional cecropia, called "guarumo" in much of tropical America, are also present. Almost no tall palms were seen in this forest, which is threaded by a network of water courses, and considerable areas are saturated with moisture and bog-like. The amount of parasitic vegetation in the forest back of La Emilia is very great and lianes are everywhere, in size from as slender as a shoe-lace to as thick as one's arm. Bromeliads were, however, not as abundant as seen later at higher elevations, although ferns and mosses were everywhere.

Aside from the distant roaring of an occasional howling monkey the La Emilia forest was comparatively silent. Parrots, parrakeets and macaws, the latter in Costa Rica called "lapa," would sometimes give discordant choruses, the tiny manakins, as in Colombia, would startle me by their snapping noises behind my back. The queer *Ibycter* caracara, there called "guaco," and the beautiful white *Leucopternis ghiesbreghti*, were the only hawks noticed, while the great variety of flycatchers, ant thrushes and

UPPER.—Giant Ceiba of the Forest, left Standing in a Potrero at La Emilia, Costa Rica.

LOWER.—The Rio Toro Amarillo, west of Guápiles, Costa Rica.

woodhewers, could be distinguished only by more exact study than I could give.

One of the hazards of work in this environment is the presence of the deadly viper *Bothrops*, called "terciopelo" or "velvet skin" by the natives. A number of other poisonous snakes occur but this one species seems, and with reason, to be more generally feared. My guide with his machete killed one almost six feet long, which was uncovered when turning dead logs in search of cockroaches which live in such situations. The very slender, thread-like snakes called "mapaná" in Colombia, and universally dreaded, were found in several situations, one being tucked away in a bromeliad. Of the remarkable lizards of this forest, one species was noticed catching large spiders.

Butterflies were numerous in the La Emilia forest, but the majority were badly battered as the rainy season was well advanced. A very large black ant, called "bala" by the natives and justly dreaded on account of the agonizing pain caused by its sting, was often seen running up and down the trunks of the large trees.

For the Orthoptera this forest was a paradise. Genera which I had described years before but never seen in life were among the commonest types, and every day added new forms and new facts to the collections and records. Species, and genera, regarding which we knew nothing more than the capture of the unique type were studied in their native environment, information secured on their immature stages, activities, etc., and full series taken for further laboratory work. Very weird walking-sticks covered with moss-like growths were found hiding among mosses and vines on prostrate tree-trunks, while one of the most remarkably formed grasshoppers ever taken in tropical America was secured in this locality. Many of the grasshoppers living in this forest have quite unorthodox grasshopper traits, while the large katydids often pass the day hidden in coiled leaves or tucked away in the large dry leaves of the guarumo. In bromeliads, under bark of dead trees, under logs, in dead wood, and numerous other situations yielded treasures. Such work is always tedious, and patience and thoroughness are necessary for proper results.

At Guápiles the electric lights of the house were my regular assistants at night, and many moths as well as certain very desirable Orthoptera were taken in this way.

A trip was made one day to the Rio Toro Amarillo, some miles west of Guápiles. This erratic river has a number of channels, which it has gouged out of the surface of the land and decorated with many enormous boulders and an incredible number of smaller ones. From one course it shifts, without warning, to another and pours down its roaring discolored flood from the slopes of Irazú. The "Linea Vieja" railroad route from the eastern coast was abandoned largely on account of the vagaries of this torrential stream.

On August 27 I left my kind host and hostess at Guápiles and, retracing my steps to Siquirres, took the main line train to San José, where I arrived early that evening. The railroad route up the valley of the Reventazón is most interesting and many splendid views are afforded of the volcanoes of Turrialba (10964 feet) and Irazú (11325 feet), and to the south of the Cordillera of Talamanca, the northern section of which is dominated by the great peaks of Chirripó Grande (12467 feet), Cerro Buena Vista (11416 feet) and Cerro de las Vueltas (9942 feet). The summits of the higher peaks were swathed in dense cloud masses most of the time I spent in Costa Rica, as the rainy season was then well advanced, but occasionally one would be favored with a glimpse of one of the higher summits, even more weird and impressive from its encircling cloud robes.

At San José my colleagues Professors J. Fidel Tristán and Anastasio Alfaro made my visit in every way a most pleasant one. San José is a most attractive city, very clean and thoroughly modern, and with many beautiful buildings. The panorama to the north of the city is a remarkable one, all of the peaks of the Central Cordillera except Turrialba being in view—Irazú to the northeast, Barba to the north, and Poás to the northwest.

Several interesting nearby types of country were examined in company with Prof. Tristán, who for a number of years had been one of my most interesting correspondents. On August 31 the two of us were off for a visit to a "finca" or farm at La Palma, a small community at five thousand feet elevation in the pass between Irazú and the eastern end of the Barba group. La Palma is a locality which was frequently visited by the late Prof. Biolley, and on certain of his trips he was accompanied by Prof. Tristán, who in more recent years has found many most

UPPER.—Gunnera insignis, a Strange Plant of the Higher Costa Rican Mountains. Volcano of Irazú, at 9200 feet.
LOWER.—The Peak of Turrialba from the Southeastern Slope of Irazú at 9250 feet.

interesting invertebrates there. La Palma is about twelve miles from San José over the old paved cart road, or "carretera," which connects San José and Carrillo, the now abandoned old terminus of the "Linea Vieja."

The pass at La Palma is regularly bathed in fog and the country is typical of the montane forest region, which approximately corresponds to the subtropical zone of Colombia. Several days were spent at La Palma, working almost all the time in fog or rain. The "potreros" or meadows were virtually saturated bogs, while the ghostly mountain forest was almost solidly fog wrapped. The moss blankets on the trees and stumps were very heavy, and even the fence posts on cleared land were covered in the same way. Bromeliads were numerous and the rotted logs and stumps furnished many places to work. The results of our stay at La Palma were of great interest, a number of forms new to science were taken and valuable notes secured upon others. There I made my first acquaintance with the strange *Peripatus*, which was found in rotting logs.

Bidding goodbye to my good friends at San José, I travelled eastward for a short visit and some field work with Mr. C. H. Lankester at Cartago. Mr. Lankester, an old correspondent of mine, is a very keen naturalist—a botanist, ornithologist and entomologist—who through years of residence in Costa Rica has acquired an excellent knowledge of the country, its fauna and flora.

A day was spent by us on the slopes of La Carpintera, one of the most northern spurs of the Great Talamancan Cordillera, here forming with a southwestern ridge of Irazú the continental divide. We reached an elevation of six thousand, one hundred feet (aneroid) and found, rather unexpectedly, some areas of primeval forest. La Carpintera, it will be understood, is but a few miles from the comparatively ancient city of Cartago, and between that place and San José. Tree ferns were numerous in this forest, thickets of bamboo were present and many bromeliads were in evidence. The results here in my own field of study were most important, as exactly similar conditions were not examined elsewhere the past season. A remarkable spiny walking-stick was one of the outstanding species taken. In the Laguna de Ochomogo at the north base of La Carpintera several masked ducks (*Nomonyx*) and

several coot (*Fulica*) were disporting themselves, while the home-like notes of the meadow larks were to be heard all about.

By the kind invitation of Don Marco Aurelio Gonzalez, Mr. Lankester and I were able to use his beautifully situated home at Pacayas on the slopes of Irazú as a base for examining the upper parts of the volcano. Don Marco most kindly journeyed from San José and spent several days at Pacayas with us, personally accompanying us to promising localities and helping us in our work, while horses and guides were placed at our disposal for the longer trips.

Pacayas is a small settlement on the southeastern slopes of Irazú, at an elevation of six thousand, two hundred and fifty feet, nearly three thousand above the station of Santiago, where we left the railroad. From Pacayas the panorama to the south was most splendid, particularly when the cloud masses lifted sufficiently to show some of the towering summits of the Cordillera de Talamanca. The Reventazón Valley lay below, while to the north the slopes of the volcano stretched up until lost in the almost invariably present cloud mantle. At Pacayas the forest showed many shrubs of more northern types, a few being alder (*Alnus*), blackberry (*Rubus*) and elder (*Sambucus*). The bird-life showed similar tendencies, such as a brown robin-like type, while a green toucan (*Aulacorhamphus*) emphasized the mountain tropical influence, as the genus does in Colombia. Of the most interesting Orthoptera taken there, under conditions of natural forest and cultivated fields, two grasshoppers were representatives of northern types, as clearly marked as the plant evidence.

After several days one which promised well for clearness was utilized to visit the upper slopes of Irazú. Great areas of the southern slopes of the volcano have been completely deforested, others have been merely opened up by the felling of a large part of the trees and the destruction of the undergrowth. The large trees left standing serve as shade for cattle in the dry season, as dairying is one of the most important, if not the most important, occupation on the south slope of Irazú. As our horses climbed steadily the view to the south, to and across the Reventazón Valley, broadened and one could pick out Cachí, Orosi, the Navarro ridge, the high Santa Maria de Dota in the distance, and far off to the southeast

the bulk of Chirripó Grande. Though generally the clouds jealously guarded the Talamancan Cordillera, occasionally they would lift sufficiently to give glimpses of a region of high and impressive mountain peaks.

Above Coliblanco (7540 feet) the pasture land had many moss-covered mouldering logs, and at eight thousand, three hundred feet we found several most interesting types of montane earwigs under the bark and in the rotting wood of some of these logs. Many wonderful orchids greatly interested my companion, who is an orchid authority, and the remarkable modifications of these extraordinary plants were well exemplified by those observed. One enormous cluster of crimson *Cavendishia* covered the whole top of a dead stump, while some of the smaller orchids with but a single bloom tucked away in masses of commoner forms were wondrously beautiful. As we ascended a steadily increasing number of the trees and shrubs represented genera of northern affinity.

At about nine thousand, one hundred and fifty feet, we had a wonderful view of the jagged summit of Turrialba to the east, as it emerged for a short time from the clouds. Here we passed sharply from timbered pasture land to steep forest slope, as we abruptly crossed to the far more precipitous northern slopes of the volcano. To the north the Santa Clara Plains and the lower northern slopes of Irazú were solidly cloud-mantled, and great patches were regularly drifting overhead and passing into the new crater of the volcano, which was but a short distance above us.

One of the remarkable plants of this region is *Gunnera insignis*, the great leaves of which reach as much as four feet across. The plant roughly resembles an enormous rhubarb but with a distinct trunk, the leaves are very rough and the stems spiny. The dead leaves crumple up like very coarse paper and afford ideal hiding places for certain of the peculiar earwigs known only from the higher levels of this greatest of Costa Rican volcanoes. Huckleberry (*Vaccinium*), groundsel (*Senecio*) and boneset (*Eupatorium*), were among the plants found at this elevation which showed the northern tendencies of the flora. The forest is dense and the trees of moderate height, the bromeliads nearly all quite high above the ground.

Twice while we were on the upper slopes Irazú muttered in its sleep, making a sound like thunder or the rumble of many trains. We found later, on checking the time, that both had been recorded on the seismograph at San José. In many places on the steep slopes were land-slip exposures of fifty feet of lava, pumice and interbedded ash, while in one place over all the lava was nearly forty feet of clear ash.

Of the birds seen on the upper slopes of Irazú the most conspicuous was the blackish robin *Planesticus nigrescens*, which hopped about like our old friend at home. Below Coliblanco two swallow-tailed kites performed wonderful aerial evolutions, while the homely "zopilote," or black vulture, was seen as high as nine thousand feet.

On September 9 I left Cartago and my hospitable friends, the Lankesters, and returned to Limón. The next day I had the experience of riding nearly forty miles at night, and largely in a steady rain, on a gasoline track-car to the Estrella Valley. The greater part of my last week in Costa Rica was spent in this interesting region, which is about thirty miles in an airline south of Limón. The valley is relatively narrow and is now largely taken up with banana farms, but the hills on each side are covered with forest, and inland of the banana country stretches many miles of forested mountains, rising ridge upon ridge to the higher Cordillera of Talamanca. Except for the narrow banana strip along the Rio Estrella the country is absolutely primeval and undeveloped. Talamancan Indians occasionally work on the banana farms, but most of their labor, as elsewhere in the banana country of Costa Rica, is Jamaican negro.

With Aurora Farm as a base I worked in a number of different environments, finding conditions in this far lower, much nearer sea-level forest country, quite different from those about Guápiles. The forest was as dense, but the large trees were fewer, palms were more frequent, the undergrowth as heavy but lower, and the leaf canopy with fewer sunlight "holes." Parasitic plants were not as numerous and workable dead logs fewer, while in places the forest was much wetter than about Guápiles. One of the most numerous trees there is the black palm, which has stilt-like roots and a layer of dark hard wood in the older trees, which encircles the soft pithy center. This dark wood is used for pins in furniture and similar things.

Many of the Orthoptera taken in the Estrella Valley represented quite different species from those taken about Guápiles. Some of the most interesting forms belonged to that group of very small grasshoppers for which the vernacular name is "grouse locusts." One of these possessed a mottled greenish lichen-like pattern which is doubtless of the greatest protective value to it.

On September 15 I left Limón homeward bound, and, on September 23, reached Philadelphia after a season's work of the most productive character—in material secured, observations made, and definite data assembled on a number of problems regarding which we needed information very greatly. The full value of the work completed, of course, can be realized only after the detailed study of the collected material and observations.

The Academy and the author wish to acknowledge the cordial coöperation received from the officials of the United Fruit Company, and particularly the substantial assistance of Mr. Victor M. Cutter, Vice-President in charge of Tropical Operations. His Excellency, Sir Leslie Probyn, the Governor of Jamaica, and the Government of Costa Rica, through his Excellency, Señor Don Rafael Oreamuno, Minister of Costa Rica at Washington, kindly permitted the free entry of collecting materials and cordially assisted in other ways. The Hon. C. L. Latham, American Consul at Kingston, and the Hon. John James Meily, our Consul at Limón, both assisted in every way in their power, and it is a pleasure to acknowledge my obligations to them. Mr. David Taylor, Assistant Manager of the Costa Rican Division of the United Fruit Company, Mr. Samuel Kress, Agricultural Superintendent of the same division, and Mr. J. H. Soothill, Superintendent of the Santa Clara District at Guápiles, and Mrs. Soothill, my host and hostess for over two weeks, all assisted me most cordially and whole-heartedly, and rendered possible work under conditions of the most favorable sort.

It is a pleasure to acknowledge the courtesy and hospitality of Señor Don Marco Aurelio Gonzalez, my host at Pacayas, and the kind assistance and friendly coöperation in many ways, the past summer and many other times, of my good friends Profs. J. Fidel Tristán and Anastasio Alfaro, of San José, and Mr. and Mrs. C. H. Lankester of Cartago. The name of Pleasant Hill will always recall

to me the kindly interest and cordial hospitality of Mr. and Mrs. W. H. Landale, my host and hostess at Pleasant Hill House, Jamaica.

MODEL OF A MALOKA,—HOUSE OF THE ARAWAK INDIANS

H. NEWELL WARDLE

The Arawak and Carib tribes of British Guiana have long been represented in the collections of this Academy by a rich series of ethnographica, gathered half a century ago. These objects, which illustrate the daily and ceremonial life of tribes untouched by civilization, have now been unified by the addition to our collection of a model of a Maloka, the Arawak Indian house, the gift of Miss Dorothy Mallon in memory of her mother, Mrs. Emma Baeder Mallon. The Maloka was obtained from an Arawak tribe in the interior of British Guiana, while the party was en route to the Falls of Kaieteur.

The model, which is of the oblong house type and without walls, measures 35 by 22 inches, with a height of 20 inches, and is complete with its six decorated posts and palm-leaf thatch. No nails or pegs have been used in its construction, lashings of native fiber taking their place. From the beams under the edge of the thatch hang the objects of daily use in miniature, though not always proportionally small enough for the dwelling—the cylindrical cassava press and the square sieve for the cassava meal necessary in the remarkable native process by which the *Manihot* root is freed of its poisonous juice. Here too are the fire-fans which are also the cake-turners for the cassava bread. Necklaces and girdles of animal teeth and rattling nuts festoon the sides and gable ends, and a shaman's gourd rattle proclaims the dance and ceremony, while three tiny women's aprons, beaded in patterns which represent the snake and the "darli," or wild nutmeg, announce the presence of three matrons in the family. The men are represented by a sapacana, or wooden war-club and the bundle of long arrows and bow tied across the transverse house beams, as is also a long fishing pole with line and hook. Swung parallel with each of the

Model of a Maloka, or Arawak House.

four sides of the Maloka is a hammock—a bed by night, convenient seat by day.

An object of particular interest is the little loom with unfinished fabric and tiny shuttles. It hangs in the cool interior of the dwelling and beside it a basket with bunches of unspun cotton, white and brown. Near the central post of one house-side is suspended a painted wooden carving representing a toucan, but large out of all proportion, and without legs. Beside it are the dried legs and feet of a heron. The purpose of these is unknown.

In the stream-cut tropical forest region from which this model came, the watercourses are the highways, and the means of travel have not been forgotten by its Arawak maker. Two canoes are suspended from the rafters within the house, one an ordinary dugout, and a more elaborate model with upright bow and stern boards bearing painted bird decoration. The paddles for these canoes have not been overlooked. A third boat of the batelão type is provided—a dugout with palm-leaf awning amidship.

It will thus be seen that while a few of the essential household objects have been omitted, or perhaps lost, notably the characteristic pottery, the cassava grater, and the man's pegall or basket trunk for his trinkets and the gorgeous feather headdress worn in the dance, still this model is remarkably complete and is a valuable addition to the Academy's collection, affording lively illustration to the real specimens long preserved within our cases. It is to be hoped that this, which is the first dwelling model this museum has possessed, may lead to the acquirement of models typical of the homes of other tribes. Their educational value is undoubtedly great.

ADMINISTRATION OF THE MUSEUM

BOARD OF CURATORS

WITMER STONE, *Executive Curator.* HENRY A. PILSBRY, *Secretary.*
T. CHALKLEY PALMER, GEORGE L. HARRISON, JR.

SCIENTIFIC STAFF

Vertebrate Zoology

WITMER STONE, *Special Curator.*
WHARTON HUBER, *Assistant Curator, Birds and Mammals.*
HENRY W. FOWLER, *Assistant Curator, Fishes and Reptiles.*

Mollusca and other Marine Invertebrates.

HENRY A. PILSBRY, *Special Curator.*
EDWARD G. VANATTA, *Assistant Curator.*

Insects

HENRY SKINNER, *Special Curator.*
JAMES A. G. REHN, *Assistant Curator.*
E. T. CRESSON, JR., *Assistant Curator.*
MORGAN HEBARD, *Research Associate.*
ROSWELL C. WILLIAMS, JR., *Research Associate.*

Plants

FRANCIS W. PENNELL, *Special Curator.*
BAYARD LONG, *Research Associate.*

Minerals and Rocks

FRANK J. KEELEY, *Curator of the William S. Vaux Collections.*
SAMUEL G. GORDON, *Assistant Curator, in charge of the General Collection.*

Archeology

MISS H. NEWELL WARDLE, *Assistant Curator, in charge.*

Ludwick Department of Public Instruction.

HAROLD T. GREEN, *in charge.*

Taxidermist

DAVID MCCADDEN.

ANNUAL REPORTS

Report of the Curators

The Museum halls have been open to the public throughout the year, and there has been a large attendance of visitors, notably on Sunday afternoons, and upon days when lectures were delivered.

The attendance of school children and classes from the Art Schools has been particularly gratifying.

Mr. Harold T. Green, in charge of the Ludwick Department of Public Instruction, besides managing the lecture courses, has prepared many notices of Academy activities for the press; and has done much to make the institution and its work better known to the public.

Several popular exhibits have been prepared in this connection, including groups of Quail, Cotton-tail Rabbit and Periodical Cicada; while the usual seasonal exhibit of local birds has been maintained. Several collections of minerals, mollusks, and birds have been supplied to schools.

The historic restoration of the dinosaur, *Hadrosaurus foulkii*, for a number of years withdrawn from exhibition was remounted on the main floor of the Museum, where it has attracted much attention.

Many additional specimens have also been displayed in the Archeological and Mineralogical Departments, and a handsome specimen of the Snow Leopard received from the Zoological Society last year has been mounted. Three exhibition cases for the Archeological Department were provided through the generosity of a friend of the Academy.

The greatest change in the arrangement of the Museum has been the moving of the general herbarium from the first floor to the upper floor of the north wing, in order to provide rooms for the Central Business Office authorized at the beginning of the year. By partitioning off the eastern end of the wing, including the first gallery, and installing radiators, commodious quarters were provided for the plant collections, which have now all been brought

together, making it possible to vacate the room used for storage temporarily in the Mineralogical Department.

By removing the collection of birds' eggs, a room was provided in the upper hallway of the central wing for the Ludwick Department of Public Instruction. Numerous storage cases were secured for the study collections of insects, and a series of extra-large glass jars for the storage of fishes, for which a rack has been erected in the alcoholic room.

Much important field work has been accomplished during the year. Mr. Fowler completed his work at the Bishop Museum, in Honolulu, early in the year, returning in April with some 12,000 specimens of fishes presented by this institution.

Mr. Samuel G. Gordon spent the summer and early autumn in the Frederikshaab and Julianehaab districts of Greenland, through the courtesy of the Danish Government and the Pennsylvania Salt Company, making collections primarily for the William S. Vaux Collection, this forming the second of the Vaux-Academy Mineralogical Expeditions. Some thirty cases of material were secured.

Mr. J. A. G. Rehn, mainly through the generosity of several members of the Academy, was enabled to spend two months in the Blue Mountains of Jamaica, and in Eastern and Central Costa Rica, collecting and studying the Orthoptera of these countries. Much important material and data were secured.

Dr. Henry A. Pilsbry was absent from June to October, as a delegate to the second Pan-Pacific Scientific Congress held in Melbourne and Sydney, Australia, and was able to make considerable collections of mollusks in Victoria, New South Wales and Queensland, receiving cordial assistance and many generous gifts from Australian conchologists.

Dr. Francis W. Pennell spent a month collecting botanical specimens in the States of the Mississippi Valley, from Indiana and Tennessee to Missouri and Arkansas; and a considerable amount of local field work was accomplished by various members of the staff which brought in much study material.

Besides the meetings of societies devoted to special branches of scientific research mentioned in the reports of the respective departments, the All-Philadelphia Conference on Social Work, and

the University of Pennsylvania Chapter of the Sigma Xi have held sessions in the lecture hall during the year.

Details of the work in the several departments follow:

MAMMALS

A number of rare and interesting specimens have been received from the Zoological Society of Philadelphia during the year, which have been prepared for the study collection, either as skins or skeletons, and much osteological material has been cleaned and catalogued.

The American Society of Mammalogists held its annual meeting at the Academy, in May, and many of the members took advantage of the opportunity to consult and study the collection. Specimens have been loaned to the U. S. Biological Survey and Dr. Glover M. Allen; and specimens of fossil mammals to Prof. Henry F. Osborn, Childs Frick, R. S. Lull and the U. S. National Museum.

BIRDS

The Hughes and Morris collections have been catalogued during the year, as well as numerous other accessions, and most of the recently acquired material has been distributed in the study series of skins. The additions to the local series have been so great that a complete rearrangement has been necessary, which makes the specimens much more readily accessible.

The most notable gift of the year was a series of bird skins from the Amazon region of Brazil, presented by Mr. Arthur H. Fisher.

The collection of birds' eggs has been moved to the mammal storage room, and a number of additional boxes secured for the arrangement and preservation of the specimens.

Work in the department has been seriously interfered with by the fact that Dr. Stone's time has been almost constantly occupied with executive duties, and by the necessity of Mr. Huber devoting part of his time to work in other departments of the museum.

The Delaware Valley Ornithological Club has continued to hold its meetings in the study room, which has stimulated interest in the work of the department, while the Fairmount Park Bird Club held a public meeting in the lecture hall.

James P. Chapin, Ludlow Griscom, Dr. Robert Cushman

Murphy and Dr. Harry C. Oberholser have studied the collections; and specimens have been loaned to Dr. F. M. Chapman, James P. Chapin and Outram Bangs.

REPTILES AND AMPHIBIANS

Mr. H. W. Fowler has cared for the numerous local specimens added to the collection, but no research work has been accomplished in this department.

A. I. Ortenberger and Dr. Thomas Barbour have borrowed material for study.

FISHES

After Mr. H. W. Fowler's return from Honolulu in April, most of his time has been occupied in caring for the large collections of South Sea fishes, presented by the Bishop Museum in return for the identification and study of their collection upon which he was engaged. The greater part of these have now been placed in jars awaiting further study.

A valuable collection of some 2000 fishes has been received from the Philippines, and several smaller series from India and Africa, which have been similarly cared for.

Mr. Fowler has also visited the U. S. National Museum and the Museum of Comparative Zoology, and studied the Collections of fishes from Oceania contained in these institutions, in connection with the work he did at the Bishop Museum, all of which is preparatory to a report on the fish fauna of this region. He has also, in course of preparation, a report on the marine fishes obtained by the American Museum of Natural History Congo Expedition 1909–1915, and on the fresh-water fishes of the Third Asiatic Expedition of the same institution, some preliminary papers on the latter expedition having already appeared. Duplicates from both of these collections will be presented to the Academy in return for Mr. Fowler's services in identifying them.

INSECTS

More than 15,000 specimens of insects have been added to the collection during the year. A large part of this material was unmounted, and much of this as well as many specimens acquired in previous years have been mounted by Miss Caroline H. Lane,

totalling about 16,000 specimens. The study and incorporation of these in the cabinets have occupied the greater part of the time of Dr. Henry Skinner, Special Curator of the department.

Mr. E. T. Cresson, Jr., has assisted, as usual, in the general care of the collection, and has spent much time in the determination of Diptera submitted by the U. S. National Museum, the American Museum of Natural History, the Canadian National Museum, Cornell University and University of Kansas, from all of which the Academy received duplicates, numbering some 400 specimens. He has also made a study of the American species of the Dipterous family Micropezidae, the results of which are being prepared for publication, while another paper on a collection of Diptera from western United States has been presented for publication in the PROCEEDINGS.

Mr. J. A. G. Rehn has continued his studies of the Blattidae of the West Indies, and has made progress on a number of reports on African Orthoptera, which have been in progress for some years. Several small collections have been determined for other institutions, and other collections have been received for study, notably series of African specimens from the Durban Museum and the Albany Museum, both of South Africa.

Mr. Morgan Hebard, Research Associate, has completed a study of one of the genera of North American Acrididae and has continued his studies of the Orthoptera of Panama and Colombia. The exchanges of Orthoptera with the British Museum of Natural History, commenced last year by him, have been even larger than at that time, and now have extended to include many of the least-known species of Orthoptera. By purchase or otherwise he has secured large collections of the order from Mexico, Ecuador, Bolivia, the Philippines and China; and all of the South American Tettigoniidae belonging to the Paris Museum has been received for study. In the Orthoptera, Mr. Hebard has continued the rearrangement of the exotic series, portions of the Acrididae and all of the Phasmidae having been so treated.

He has published the following papers: Studies in Malayan, Melanesian and Australian Tettigoniidae (Orthoptera). (In: Proc. Acad. Nat. Sci. Phila., 1922, 178 pp., 11 plates.) Dermaptera and Orthoptera from the State of Sinaloa, Mexico. Part I. Der-

maptera and Non-Saltatorial Orthoptera. (In: Trans. Amer. Entom. Soc., XLVIII, 42 pp., 2 pls.) Studies in Indian Dermaptera. (In: Memoirs of the Department of Agriculture in India, VII, 47 pp., 3 pls.) Studies in the Mantidae and Phasmidae of Panama (Orthoptera). (In: Trans. Amer. Entom. Soc., XLVIII, 35 pp., 2 pls.) Orthoptera of the Pribilof Islands, (In: North American Fauna, no. 46, 1 p.) Expedition of the California Academy of Sciences to the Gulf of California in 1921. The Dermaptera and Orthoptera. (In: Proc. Calif. Acad. Sci., (4) XII, 21 pp., 13 text figures.) An interesting New Species of the Genus Melanoplus from Central Georgia (Orthoptera, Acrididae). (In: Entom. News, XXXIV, 3 pp., 2 figs.) Studies in the Dermaptera and Orthoptera of Colombia. Third paper. Orthopterous Family Acrididae. (In: Trans. Amer. Entom. Soc., XLIX, 148 pp., 8 pls.)

Mr. R. C. Williams, Jr., Research Associate, has made valuable studies in the family Hesperiidae, and has rearranged the genus *Thanaos;* while Miss A. F. Braun of Cincinnati, an expert student of the Microlepidoptera, has very kindly mounted the specimens of these insects contained in the Chambers collection presented many years ago.

The Academy is indebted to Mr. Frank R. Mason for his study and preparation of a large number of Coleoptera in the collection; and valuable accessions to this order have been received from Dr. F. E. Blaisdell, of San Francisco, collected by him on the Pacific Coast.

Dr. Philip P. Calvert has continued his studies of the Odonata and has added to the value of the splendid collection made by himself and presented some years ago to the Academy.

Specimens have been loaned to Dr. Calvert and J. M. Bruce.

MOLLUSKS

Accessions to the collection of mollusks have been received from seventy-seven individuals and institutions. Among the more interesting of these may be mentioned the African series from the American Museum of Natural History Congo Expedition and from Dr. J. Bequaert; series from Bermuda from Hiram Hoyt and Arthur Haycock; and Colorado mollusks from Dr. Junius Henderson, including paratypes of numerous *Pisidia.*

Dr. H. A. Pilsbry, Special Curator of the department, who was absent from June to October, has been engaged since his return in preparing the large collections which he obtained in Australia for study.

Mr. E. G. Vanatta has been engaged chiefly in preparing and cataloguing accessions to the collections, and in identifying material for correspondents, ninety-seven lots having been reported upon.

PLANTS

The chief event of the year in the Botanical Department has been the moving of the main collections to more commodious quarters. In February the General Herbarium was transferred from the rooms on the ground floor at the northeast corner of the building to the floor and balcony situated directly above the Local Herbarium rooms. In the old location, the herbarium had been seriously cramped for space, whereas there is now room for additional cases.

Mounting has continued during the year, but with the general accessions for 1923 totalling over 10,000 specimens, the single mounter for the General Herbarium can do little more than keep abreast of the new material received.

In the General Herbarium the geographical arranging of the specimens of each species has continued, Mr. Fogg having finished the Menthaceae, and Dr. Pennell the Scrophulariaceae, while Dr. Leffmann has made very considerable progress through the vast family Asteraceae. We desire more volunteers for this interesting work, so that the whole herbarium may be brought into condition for satisfactory ready reference.

Mr. Miles Vollmer has, under the Jessup Fund, given half-time since October 1922, helping in the General Herbarium. Miss Ada Allen, who has mounted plants for the herbarium since 1903, continues her experienced and careful work as preparator.

Little research work was accomplished by Dr. Pennell during the year, much time having been unavoidably consumed in the moving of the General Herbarium; the geographic arranging of the Scrophulariaceae; and especially in caring for the material brought back from Colombia in 1922. This material, amounting in all to over 7,000 collection numbers and 22,000 specimens, was labelled and

sorted into sets for distribution to the four institutions participating in the Colombian expedition—a task to which Mr. Ellsworth P. Killip of the United States National Museum gave his assistance during six weeks spent at the Academy in March and April. The set assigned to the Academy has been lately prepared for mounting, and the specimens of certain families isolated for study and identification.

Various small series of Scrophulariaceae have been named at the request of correspondents, and a paper has been published in the PROCEEDINGS on the "Scrophulariaceae of Cuba." From May 28 to June 24, Dr. Pennell was engaged in field study of Scrophulariaceae in Tennessee, Arkansas, Missouri, Indiana, and Kentucky; and work has been commenced on a paper treating of this family in the Middle Atlantic and Central States.

In the Cryptogamic Herbarium, Dr. William R. Taylor of the University of Pennsylvania has completed the task of reviewing and placing in a desirable state for reference our collections of Algae. He is proposing to revise in a similar manner our collections of Bryophyta.

The Local Herbarium, under the care of Mr. Bayard Long, Research Associate, continues to receive the support of many collectors. The transference of the cryptogamic and other collections to the new quarters has permitted us to assign all three rooms on the first balcony floor to the Local Herbarium. Mr. George W. Bassett continues as assistant and preparator of specimens, and has mounted and placed in the herbarium specimens of many collectors. Progress continues in the task of mounting Mr. Long's extensive series.

The geographical arranging of specimens of each species by counties is now nearing completion, a labor which has much increased the value of the Local Herbarium for geographic study.

During the year Mr. Long has followed various problems and has published the following papers: "Sonchus uliginosus in the Philadelphia area" (*Torreya*); and "Naturalized Occurrence of Prunus padus in America" (*Rhodora*).

During 1923, visiting botanists have consulted the General Herbarium, and especially the Cryptogamic Herbarium for the study of the de Schweinitz collection of fungi. The Local Herbarium

has had several devoted consultants, chief among these being Dr. H. B. Meredith, who has studied his collections made from Massachusetts, Pennsylvania, and Virginia; and Mr. Walter M. Benner, who is engaged in a detailed study of the flora of Bucks County, Pennsylvania.

Specimens were loaned to: E. P. Killip, S. F. Blake, K. K. Mackenzie, P. A. Munz, the Gray Herbarium and the U. S. National Museum.

MINERALS

During the early part of the year Mr. Samuel G. Gordon was engaged in crystallographic and optical investigations on minerals obtained on the Vaux-Academy Andean Expedition of 1921, and on field trips to Franklin, New Jersey, in 1922, and to North Carolina in 1922 and 1923. An optical investigation was also made of all the radiating zeolites in the mineral collection.

Through the courtesy of the Danish Government and the Pennsylvania Salt Company, the Academy was enabled to send Mr. Gordon to the Frederikshaab and Julianehaab districts of Greenland. Thirty cases of minerals, as well as a collection of the rare nepheline-syenite rocks, were secured. He left Philadelphia on May 28th, and after visiting the mineralogical laboratories, and examining collections in Paris, Brussels, London, and Oxford, he joined the S. S. "Lom" at Newcastle on June 29th. He returned to Philadelphia on November 11th.

Mr. Edward Goldsmith presented to the laboratory during the year a Babinet goniometer, originally belonging to Frederick A. Genth, and a Groth Universal Apparatus. A large mercury-vapor arc has been installed for obtaining monochromatic light with suitable filters. Plans have been made for placing all the goniometers, and other apparatus in a single room recently made available.

The Philadelphia Mineralogical Club has held its meetings regularly at the Academy, and a number of students have consulted the collections.

ARCHEOLOGY

Miss H. Newell Wardle has continued in charge of the collections of this department.

During the year 1923, the archeological and ethnographical specimens added, while not numerous, are of special interest, including exceedingly rare material, such as a model of an Arawak House, with all its native gear.

Mr. Clarence B. Moore's continued interest in the Academy has enabled the Department of Archeology to arrange exchanges with other museums, which are expected to add to our collections in the near future.

The important Araparho and Cheyenne Series from the Gottschall Collection were catalogued and placed on exhibition making a particularly attractive display.

Doctor T. D. Casto made an extensive study of the Morton and Meigs Collections of Crania.

Mr. John L. Baer, of the United States National Museum, continued his research upon the "banner-stones."

The following archeologists visited the Academy to study the collections: Prof. Emmanuel de Margerie, Director, Geological Survey of Alsace-Lorraine; Dr. T. A. Joyce, Curator of American Archeology and Ethnology, British Museum; Mr. Clarke, Curator of American Archeology and Ethnology, Cambridge University; Prof. Marshall H. Saville, Museum of the American Indian, Heye Foundation; Prof. Charles R. Keyes, Research Associate, State Historical Society of Iowa.

A paper "Stone Ceremonials in Relation to Algonkin Symbolism" has been published in the PROCEEDINGS.

At the request of the Boy Scouts of America, Cumberland County New Jersey Council, Miss Wardle lectured on "Wampum" and "Life of the Old Woodland Indians."

REPORT OF THE CURATOR OF THE WILLIAM S. VAUX COLLECTIONS

During the year 102 specimens were purchased, and 37 secured by exchange, among which the most notable were descloizite from Grootfontein, S. W. Africa, a suite of cassiterite crystals from La Villader, France, crystallized stannite from Oruro, Bolivia, and an 8.5 carat cut blue zircon of fine quality.

The most important accessions consisted of specimens, numbering about five hundred, collected in Greenland by Mr. Gordon, on the second Vaux-Academy Expedition, particularly in the excavations at Narsarsuk. These include: astrophyllite, aegirite, albite, zircon, epididymite, elpidite, catapleiite, parisite, steenstrupine, eudialyte, sodalite, arfvedsonite, erikite, schizolite, aenigmatite, and rinkite.

One hundred and two species, not hitherto represented in the collection, have been added during the year, bringing the total number up to about nine hundred.

Respectfully submitted,

F. J. KEELEY,

Curator, William S. Vaux Collections.

LUDWICK DEPARTMENT OF PUBLIC INSTRUCTION

The usual courses of free public lectures have been given during the year as follows:

MONDAY EVENING COURSE

January 8 "Beavers." Vernon Bailey, U. S. Department of Agriculture.
15 "The Migration of Birds." Witmer Stone, Academy of Natural Sciences.
22 "Through the Tropical Forests of Nicaragua." J. Fletcher Street, Philadelphia.
29 "Linnaeus: His Works and His Surroundings." John W. Harshberger, University of Pennsylvania.
February 5 "Camping in the Desert." Henry A. Pilsbry, Academy of Natural Sciences.
12 "The Trail of a Trapper." Benjamin W. Mitchell, Central High School, Philadelphia.
19 "The Continent of North America." Spencer Trotter, Swarthmore College.
26 "Life in the Nest." Witmer Stone, Academy of Natural Sciences.
March 5 "Insect Structure and Classification." James A. G. Rehn, Academy of Natural Sciences.
12 "Reptiles." Spencer Trotter, Swarthmore College.
19 "Wild Life of the Mountain Heights." F. M. Schmoe, Mt. Rainier, Washington.
26 "In the Mountains of New Mexico." Henry A. Pilsbry. Academy of Natural Sciences.
April 2 "Bees and Beekeeping." E. F. Phillips, U. S. Dept. of Agriculture.
9 "Some Interesting Phases of Insect Study." James A. G. Rehn, Academy of Natural Sciences.
16 "With John Burroughs in His Favorite Haunts." G. Clyde Fisher, American Museum of Natural History, New York.
23 "Botanizing in the Colombian Andes." Francis W. Pennell, Academy of Natural Sciences.

SUNDAY AFTERNOON COURSE

February 4 "A Mineralogical Expedition in the Andes." Samuel G. Gordon, Academy of Natural Sciences.
11 "The Present State of Some of the South Sea Islands." William E. Hughes, Academy of Natural Sciences.
18 "Through the Mountains of Eastern Kentucky." Witmer Stone, Academy of Natural Sciences.
25 "The Academy Nicaraguan Expedition of 1922." Wharton Huber, Academy of Natural Sciences.
March 4 "Costa Rican Natural History." Philip P. Calvert, University of Pennsylvania.
11 "Through California to the Mexican Borderland." James A. G. Rehn, Academy of Natural Sciences.
18 "The Life of a Lake." Henry A Pilsbry, Academy of Natural Sciences.
25 "Wild Life at Home and Abroad." Arthur H. Fisher, Washington, D. C

The attendance showed a decided increase over last year, 4500 persons attending the courses. The spring course of eight afternoon lectures on local natural history for school children, given by members of the staff and covering birds, insects, mollusks and wild flowers, was not so well attended as in previous years, and a conference was held, with the heads of departments in the Board of Education, which resulted in further cooperation between the schools and the Academy.

The plan now is to offer five lectures in the autumn, and five in the spring, which as far as possible supplement the natural history studies being carried on in the schools. The results have been very satisfactory and the attendance at the five autumn lectures was more than double that of the spring course. The reservations for the lecture on wild flowers, by Dr. Stone, and on insects, by Mr. Rehn, exceeding the capacity of the hall, so that they had to be repeated.

Twenty-four different schools were represented in the attendance during the autumn, and all the scholars visited the museum either before or after the lectures. Twenty-eight other schools sent their classes to study the collections in the museum at various times during the year, as well as many others which did not register. Plans have been made to keep more accurate records of school attendance in the future.

Mr. Harold T. Green has managed all the lecture courses as well as attending to newspaper publicity regarding the educational opportunities offered by the Academy. He has also devoted much time to the installation of educational exhibits.

ADDITIONS TO THE MUSEUM

1923

MAMMALS

DR. WILLIAM L. ABBOTT. Two skins of *Neotoma*, Pennsylvania. Skin and skull of bat, Maryland.

H. WALKER HAND. Brown Shrew (*Blarina parva*).

MISS E. W. HUBER. New York Weasel (*Putorius noveboracensis*), Pennsylvania.

FRANK R. MASON. Mounted head of Long-horned Cattle, Texas, and Moose (*Alces americana*).

JAMES A. G. REHN. Little Brown Bat (*Myotis* sp.), Pennsylvania.

ZOOLOGICAL SOCIETY OF PHILADELPHIA. Nail-tailed Wallaby, skin and skull; Reddish Ocelot, skin and skull; Chimpanzee (*Pan* sp.), skin and skull; Hunting Dog (*Lycaon sictus*), skin and skeleton; Long-nosed Bandicoot, skin and skull.

BIRDS

MRS. K. ARNOLD. Young chicken with four legs.

CHARLES M. B. CADWALADER. Razor-billed Auk (*Alca torda*), North Carolina.

LAMBERT CADWALADER. Three skins of Sage Grouse (*Centrocercus urophasianus*), Wyoming.

HENRY FERNBERGER. Case of mounted birds.

ARTHUR H. FISHER. Collection of ninety-nine bird skins from the Amazon district, Brazil.

JOHN GILL, 7th. Loon (*Gavia immer*), New Jersey.

GEORGE HAPGOOD. Collection of mounted birds.

WHARTON HUBER. Skin of Sooty Shearwater (*Puffinus griseus*), New Jersey; two mounted Bald Eagles.

DR. HENRY SKINNER. Sparrow Hawk (*Falco sparverius sparverius*), Pennsylvania.

MRS. ELIZABETH STEVENSON. Five cases of mounted birds.

DR. WITMER STONE. Skin of Sooty Shearwater (*Puffinus griseus*), and five other birds, Cape May, N. J.

GEORGE H. STUART, 3rd. A series of African birds.

RICHARD VAUX. Loon (*Gavia immer*), Pennsylvania.

J. A. VEIGA. Five skins of birds from Cuba.

ARTHUR T. WAYNE. Skin of McGillivray's Seaside Sparrow (*Passerherbulus m. macgillivrayi*), South Carolina.

MRS. IRMA WETHERILL. A case of mounted birds.

ROSWELL C. WILLIAMS, JR. Eggs of Laughing Gull (*Larus atricilla*), Corson's Inlet, N. J.

ZOOLOGICAL SOCIETY OF PHILADELPHIA. Black-collared Barbet (*Lybius torquatus*); Bearded Vulture (*Gypaetus barbatus*); Minah (*Mino dumonti*); Crested

Eagle (*Spizaetus tyrannus*); Hawk (*Falco rupicoloides*); Rosy Flamingo (*Phoenicopterus roseus*); Regent Bower-bird (*Sericulus melinus*).

REPTILES AND AMPHIBIANS

GEORGE W. BASSETT. Wood Frog (*Rana sylvatica*), New Jersey.

JAMES B. CLARK. Collection of snakes from Florida.

HAROLD T. GREEN. Muhlenberg's Turtle (*Clemmys muhlenbergii*), New Jersey.

DAVID MCCADDEN. Diamond-backed Terrapin (*Malaclemmys centrata*); Spotted Turtle (*Clemmys guttata*).

DR. FRANCIS W. PENNELL. Snake (*Lachesis* sp.), Colombia.

DR. HENRY A. PILSBRY. Collection of Reptiles from New York State; Jar of lizards from Mexico.

DR. WITMER STONE. Spotted Turtle (*Clemmys guttata*), Cape May, N. J.

ACADEMY EXPEDITION TO JAMAICA AND COSTA RICA. Two Jars of Reptiles from Costa Rica and Jamaica.

R. W. WEHRLE. Two Soft-shelled Turtles (*Aspidonectes spinifer*); Grass Snake (*Liopeltis vernalis*); jar of Salamanders, Pennsylvania.

ZOOLOGICAL SOCIETY OF PHILADELPHIA. Five jars of reptiles.

FISHES

BERNICE PAUAHI BISHOP MUSEUM. A collection of 7000 fishes, Oceania.

CONNECTICUT STATE BOARD OF FISHERIES AND GAME. A collection of Connecticut fishes.

HENRY W. FOWLER. Collection of 5000 Hawaiian Fishes.

HAROLD T. GREEN. Specimens of Blind Lampreys, New York.

H. WALKER HAND. Two fishes, Cape May, N. J.

FREDERICK HILDEBRAND. (*Diodon hystrix.*)

JAMES HORNELL. Two collections of Fishes, India.

NATAL FISHERIES INSPECTOR. Collection of 28 fishes, South Africa.

PURCHASED. Collection of 2000 Philippine Fishes.

INSECTS

DR. WILLIAM L. ABBOTT. One orthopterous insect, one coleopteron and four Lepidoptera, San Domingo.

ACADEMY-AMERICAN MUSEUM ARIZONA EXPEDITION 1916. Sixteen *Ligurotettix*, Arizona.

ACADEMY EXPEDITION TO JAMAICA AND COSTA RICA 1923. Twenty-three hundred and sixty-seven Orthoptera and 1960 other insects.

A. R. ALLEN, JR. *Pelecinus polyturator*, Maine.

AMERICAN MUSEUM OF NATURAL HISTORY. Twelve Coleoptera.

WILLIAM BARNES. Eleven Lepidoptera, United States.

ERNEST L. BELL. Four *Thorybes confusus*, Arkansas.

HENRY BIRD. Four *Papaipema*.

DR. F. E. BLAISDELL. Two hundred and eighty Coleoptera, California.

DR. BOUCHELLE AND MR. MACKENZIE. Three hundred and sixty-six Orthoptera, Nicaragua.

A. F. BRAUN. Twenty-eight Microlepidoptera, United States.

BRITISH MUSEUM NATURAL HISTORY. Seven Hesperiidae, South America.

JOSE CABRERA. Sixty-nine Orthoptera, types and paratypes of *Eurycotis lacernata* and *E. balteata*, Cuba.

DR. P. P. CALVERT. Two lepidopterous pupa. One Ant-lion, Costa Rica.

A. D. CLARK. *Diapheromera femorata.*

DR. JOHN A. COMSTOCK. Twenty-two Rhopalocera, California.

W. J. COXEY. One *Alcidis aurora* and two *Chilepteryx collesi*, Australia; three Hesperiidae, Florida.

W. C. DUKES. Thirty-one Lepidoptera.

ARTHUR H. FISHER. *Catagramma cyclops*, Brazil.

G. B. FOX. Two insects, Arizona.

L. G. GENTNER. Five Coleoptera.

J. R. GILLEN. *Hippiscus apiculatus*, Pennsylvania.

DAVID HARROWER. Forty Orthoptera from Panama.

MORGAN HEBARD. Two hundred Acrididae, Panama; four hundred and fifty moths, Maine; four hundred and twenty-three Coleoptera, western United States. Twenty-six insects from Philippines.

DR. W. E. HUGHES. Four Lepidoptera, West Indies.

E. C. JAEGER. Two Coleoptera.

DR. ALFRED C. KINSEY. Seventy-six Gall-insects with galls; two hundred and sixty-eight insects and two hundred and ten galls of the Cynipidae.

ALEX. B. KLOTZ. *Eurema proterpia watsonia*, Ecuador.

L. R. KNOBEL. Twenty Rhopalocera, Arkansas.

PHILIP LAURENT. One larva, two *Eudamus*, Florida.

ALEXANDER H. LEIGHTON. Two Coleoptera.

R. A. LEUSSLER. Twenty-four Rhopalocera, Nebraska.

S. F. LIGHT. One hundred and thirty-one Odonata; one hundred and forty-four Lepidoptera, China.

FRANK R. MASON. Five *Mordellisterna*, Eastern States.

LEVI W. MENGEL. Two *Anaea panariste*; one *Prepona praeneste*, Colombia.

J. S. MCKENZIE. Five boxes of insects, Nicaragua.

DR. J. MCDUNNOUGH. Two *Argynnis*, British Columbia.

DR. H. A. PILSBRY. Forty-one butterflies and twelve other insects, Australia.

PURCHASED. One hundred and eighty-nine Chinese Orthoptera and eight *Agrias*, Ecuador.

DR. W. D. ROBINSON. One Chinese Mantis, Pennsylvania.

DR. H. SKINNER. Twenty-two Hesperiidae, Jamaica; *Argynnis apacheana*, California.

L. STOCKMAN. *Schizodactylus monstrosus.*

U. S. NATIONAL MUSEUM. Two paratypes and four other Buprestidae, Cuba; twelve Coleoptera.

H. L. VIERECK. Thirty Lepidoptera and one orthopteron, Colombia.

J. J. WHITE. One hundred and fifty-six Rhopalocera, Mexico.

R. C. WILLIAMS, JR. Seventy-six Hesperiidae; four *Hesperia xanthus*, Arizona; *Pamphila viridis*, New Mexico.

JESSE H. WILLIAMSON. Six hundred and twenty Odonata, Brazil; one hundred and four Odonata, Central America.

MISS JOSEPHINE WILLIS. Six Orthoptera and two Odonata.

RECENT MOLLUSCA

DR. W. L. ABBOTT. Six trays of shells, Hayti and Maryland.

W. O. ABBOTT. Twenty-nine trays of shells, England and France.

ACADEMY EXPEDITION TO COSTA RICA. Thirty trays of shells, Jamaica and Costa Rica.

DR. M. S. ALFONSO. Twelve species of Cuban *Cerion*.

AMERICAN MUSEUM OF NATURAL HISTORY. Ninety-two trays of African shells.

J. BAILY, JR. Six species of land shells, California.

F. C. BAKER. The type of *Planorbis pseudotrivolvis* Bak.

DR. H. B. BAKER. *Ambloxis rufum* Hald., Philadelphia, Pa.

J. BEATER. *Neritina lineolata* Lam., Fort Myers, Florida.

M. G. BECKWITH. Ten trays of shells, New York and Territory of Hawaii.

DR. J. BEQUAERT. Two hundred and eighty-nine trays of shells, Africa and United States.

E. W. BERRY. Nine species of shells, Virginia.

BERNICE PAUAHI BISHOP MUSEUM (Exchange). Eight species of land shells, Territory of Hawaii.

S. C. BISHOP. Three species of shells, North Carolina.

DR. W. BLUME (Exchange). Forty-seven trays of shells.

J. BRAZIER. Fifty-seven trays of shells, South Pacific.

L. H. BREGY. Twelve trays of land shells, France and Bermuda.

DR. C. T. BRUES. Two species of fresh water shells, Wyoming.

H. C. BURNUP. Three species of African land shells.

A. C. CHANDLER. Two land shells, Texas.

J. B. CLARK. Twenty-seven trays of shells, Eastern United States.

PROF. T. D. A. COCKERELL. Fifteen trays of land shells, Asia and Nebraska.

MAJ. M. CONNOLLY. Five African land shells.

J. P. COY. *Milax gagates* Drap., San Bernardino County, California.

DR. W. H. DALL. *Micrarionta necrotopica* Dall., Deadmans Point, California.

W. T. DAVIS. *Anodonta implicatus* Say, Brooklyn, New York.

T. T. DRANGA. *Tridacna elongata* Lam., Palmyra Island.

E. M. EHRHORN. Three species of shells, Ballina, Australia.

J. H. FERRISS. Four land shells, Arizona.

A. H. FISHER. Three species of shells, Brazil.

H. W. FOWLER. One *Bythinia*, China.

J. H. GATLIFF (Exchange). Twenty-four Australian shells.

S. G. GORDON. Six trays of marine shells, Greenland.

H. T. GREEN. *Succinea ovalis* Say, Doansville, New York.

HAMBURG MUSEUM (Exchange). Twenty-five Mexican land shells.

G. L. HARRISON, JR. Nine species of shells, New Hampshire and Canada.

A. HAYCOCK. Eleven trays of land shells, Bermuda.

MORGAN HEBARD. Forty-six trays of shells, Florida and New Mexico.

C. HEDLEY. Two marine shells, South Pacific.

J. B. HENDERSON. *Dentalium c. flavum* Hend., Key West, Florida.

PROF. J. HENDERSON. One hundred and twenty-nine land and fresh water shells, Colorado.

C. P. HICKMAN. Two *Succinea*, Maine and New Jersey.

A. A. HINKLEY. Fourteen trays of shells, Guatemala.

A. T. HOPWOOD (Exchange). *Conus coromandelicus* Sm., Gulf of Oman.

H. C. HOYT. One hundred and nineteen trays of shells, Bermuda.

W. HUBER. *Melo diadema* Lam.

T. W. HUIDEKOPER. Two species of *Calliostoma*.

A. F. B. HULL. Sixteen trays of Australian shells.

R. W. JACKSON. Thirty-eight trays of shells.

A. JACOT. *Lymnæa palustris* Mull., Ithaca, New York.

F. JAMES. Two land shells.

C. KAUFFELD. *Cypræa tigris* L.

F. J. KEELEY. *Sphaerium sulcatum* Lam., Ogunquit, Maine.

H. LANG. Two species of *Ampullaria*, British Guiana.

B. LONG. Twenty trays of fresh water shells, New Jersey and Pennsylvania.

D. MAC KINON. Pearl from *Ostrea elongata* Sol.

J. G. MALONE. Thirty-eight trays of shells, Mexico and Oregon.

D. P. MANNIX. Three species of marine shells.

DR. H. B. MEREDITH. Two fresh water shells, Pennsylvania.

CLARENCE B. MOORE. Fifty-four trays of shells, Florida.

MUSEUM COMPARATIVE ZOOLOGY (Exchange). *Planorbis p. walkeri* Van., Fairhaven, Vermont.

C. T. MUSSON. *Rhytida*, Sydney, Australia.

I. S. OLDROYD. *Vertigo californica* Row., San Nicolas Island, California.

J. M. OSTERGARD. *Mitra mitra* L., Hawaiian Islands.

LT. COL. A. J. PEILE. Ten trays of Bermudan land shells.

DR. F. W. PENNELL. Five species of Colombian shells.

PHILADELPHIA SCHOOL OF DESIGN FOR WOMEN (Exchange). Ninty-five trays of marine shells.

E. PILSBRY. Two marine shells, Maine.

DR. H. A. PILSBRY. Fifty-six trays of shells.

J. PLANTON. Four marine shells, Chili.

P. B. RANDOLPH. Four species of fresh water shells, Seattle, Washington.

PROF. B. SMITH. Five fresh water shells, New York.

F. D. STETSON. *Anomalocardia cuneimeris* Conr., Gasparilla Island, Florida.

H. STOKES. Five species of marine shells.

COL. R. W. TATE. Four trays of Samoan shells.

D. THAANUM. Forty-six trays of shells, Japan.

T. H. THOMSON. *Theodoxus merionalis* Phil., Senegal.

PROF. C. DE LA TORRE. Four Cuban Cerions.

G. L. TROMNER. *Neritina lineolata* Lam., Fort Myers, Florida.

E. G. VANATTA. Four land shells.

T. VAN HYNING. Sixty-three trays of shells, Florida.

DR. G. VAN INGEN. Six fresh water shells, New York.
DR. B. WALKER. Eight trays of shells.
J. B. WALTER. Three fresh water shells, Pennsylvania.
H. S. WASHINGTON. Seven land shells, Tunis.
M. J. C. WHITAKER. Five marine shells.
MISS H. WINCHESTER. Pearl from *Ostrea elongata* Sol.

OTHER INVERTEBRATES

BERNICE PAUAHI BISHOP MUSEUM. Six Hawaiian barnacles.
J. BRAZIER. *Frenulina pulchella* Sby., Port Jackson, Australia.
DR. W. T. COLMAN. *Coronula reginae* Dar., South Shetland Island.
J. G. MALONE. *Balanus aquila* Pils., Port Harford, California.
A. J. SIDDALL. *Euplectella*.
U. S. NATIONAL MUSEUM. Four barnacles, Curaçao.

FOSSIL INVERTEBRATES

L. H. BREGY. One brachiopod, France.
M. G. COOK. One *Naticopsis*, Texas.
M. HEBARD. Sixty species of shells, Florida.
A. T. HOPWOOD (Exchange). Nine species of *Conus*, Europe.

PLANTS

DR. W. L. ABBOTT. Two hundred and fifty specimens from Pennsylvania' Maryland and New Jersey.

MRS. ROBERT ARMSTRONG. Specimens of *Centaurea macrocephala* (cultivated).

FRANK BALL. *Bromus incanus*, Bucks Co., Pennsylvania.

G. W. BASSETT. One thousand one hundred specimens, New Jersey and Pennsylvania.

G. W. BASSETT, A. T. BEALS AND A. J. SLUYTER. Five hundred and forty-one specimens, vicinity of Red Bank, New Jersey.

G. W. BASSETT AND H. A. LANG. Fifty specimens, Mantua, New Jersey.

W. M. BENNER. One thousand specimens, Bucks Co., Pennsylvania, and New Jersey.

HAROLD BRAIDWOOD. *Equisetum arvense*, Anglesea, New Jersey.

T. R. BRENDLE, JOSEPH CRAWFORD, LEE SOWDEN AND C. S. WERTSNER. Eleven specimens, Perkiomen Valley, Pennsylvania.

MRS. H. P. BRINTON. Three specimens, Chester Co., Pennsylvania.

DR. N. L. BRITTON. Six Scrophulariaceae, Cuba and Porto Rico.

O. H. BROWN. Fifty specimens, Cape May Co., New Jersey.

MRS. S. W. CREASEY. *Mamillaria missouriensis*, South Dakota.

C. C. DEAM. Three hundred and seventy-two specimens, Indiana.

W. C. FERGUSON. Specimens of *Sagittaria* and *Polygonum*, Long Island, New York.

M. L. FERNALD. *Sonchus uliginosus glabrescens*, New Brunswick.

FIELD MUSEUM OF NATURAL HISTORY. Ninety-eight Scrophulariaceae collected by Macbride and Featherstone in Peru.

FOREST SERVICE. Twenty-eight specimens, chiefly Scrophulariaceae, Montana, Utah and New Mexico.

F. B. FOSTER. *Lamium amplexicaule*, Phoenixville, Pennsylvania.

MISS HANNAH FOX. *Cornus amomum*, Foxboro, Pennsylvania.

DR. C. D. FRETZ. Three hundred specimens, Bucks Co., Pennsylvania.

DR. H. A. GLEASON. Six hundred and sixteen specimens collected by J. S. de La Crux in British Guiana.

MRS. A. L. GRANT. Twenty-seven Scrophulariaceae, California.

DR. R. M. HARPER. Twenty-nine specimens, Alabama, and Arkansas.

A. A. HELLER. One thousand four hundred and sixty-six specimens, California.

MISS E. M. KITTREDGE. *Veronica agrestis* and *Osmunda cinnamomea auriculata*, Vermont.

PROF. W. A. KLINE. *Thymus serpyllum* and *Galium verum*, Collegeville, Pennsylvania.

H. A. LANG. Two hundred and fifty specimens, chiefly the Wissahickon, Philadelphia.

A. N. LEEDS. Twelve specimens, New Jersey, Pennsylvania, and Maryland.

DR. HENRY LEFFMANN. Thirty-five specimens, collected by C. E. Raison in England.

BAYARD LONG. Two thousand specimens, New Jersey, Pennsylvania, Delaware, and Maryland.

DAVID MCCADDEN. *Spiranthes cernua* and *Oxalis violacea*, Chester Co., Pennsylvania.

ALEXANDER MACELWEE. Forty-six specimens, South Sterling, Pennsylvania.

MRS. ALEXANDER MACELWEE. About 1000 cultivated and indigenous plants from herbarium of the late Alexander MacElwee.

DR. H. B. MEREDITH. One thousand and one hundred specimens, Massachusetts, New Jersey, and Pennsylvania.

MISSOURI BOTANICAL GARDEN (Exchange). One hundred and ten specimens.

J. R. MUMBAUER. *Dicentra canadensis*, Montgomery Co., Pennsylvania.

NEW JERSEY AGRICULTURAL EXPERIMENT STATION (Exchange). One hundred and fourteen specimens.

NEW YORK BOTANICAL GARDEN. One hundred specimens, New York, New Jersey, and Pennsylvania.

NICARAGUA EXPEDITION, 1922. Twenty-nine specimens, Nicaragua.

REV. J. P. OTIS. One hundred and twenty-five specimens, Delaware.

MISS M. E. OTSTOT. *Eubotrys racemosa*, Mt. Holly, New Jersey.

E. J. PALMER. Seven Scrophulariaceae, Arkansas, Oklahoma, and Texas.

T. C. PALMER. *Mazus rugosus*, Wissahickon, Philadelphia.

D. C. PEATTIE. Five Scrophulariaceae, North Carolina.

DR. F. W. PENNELL. Eight hundred and thirty-one specimens, eastern United States; and 30 specimens, Jamaica and Haiti.

DR. F. W. PENNELL, E. P. KILLIP AND DR. T. E. HAZEN. Four thousand and eight hundred specimens, Colombia.

J. R. PENNELL. Fifteen specimens, Delaware Co., Pennsylvania.

DR. H. A. PILSBRY. Four hundred specimens, New Mexico.

POMONA COLLEGE. *Gerardia paniculata* collected by M. E. Jones in Mexico.

H. W. PRETZ. Four hundred specimens, Lehigh Co., Pennsylvania.

GEORGE REDLES. Twenty-five specimens, New Jersey and Pennsylvania.

DR. P. A. SHEAFF. Mushroom embedded in asphalt pavement.

DR. WITMER STONE. Thirty-eight specimens, South Carolina and New Jersey.

F. H. STROHM. *Hieracium pratense*, Telford, Pennsylvania.

H. W. TRUDELL. Aquatic plants, New Jersey; and 116 specimens, Virginia, North and South Carolina, and Georgia.

UNITED STATES NATIONAL MUSEUM (Exchange). Two thousand and seventy specimens.

S. S. VAN PELT. *Ranunculus repens*, Philadelphia.

C. E. VARNUM. Forty-one specimens, chiefly *Quercus*, southern New Jersey.

J. B. WALTER. *Pogonia ophioglossoides*, Long Beach Island, New Jersey.

MISS H. N. WARDLE. Fruiting specimens of *Ginkgo*, Academy, Pennsylvania.

C. A. WEATHERBY. Ninety-five specimens, New England.

C. S. WERTSNER. *Arisaema dracontium*, Bucks Co., Pennsylvania.

DR. E. T. WHERRY. *Helenium tenuifolium*, Pennsylvania; and 11 plants, Florida.

MISS M. H. WILLIAMS. One hundred and twenty-five local specimens.

MRS. MARY WRIGHT. *Dudleyi rusbyi*, Arizona.

UNIVERSITY OF WYOMING. Thirty-seven Scrophulariaceae collected by Dr. E. B. Payson in Wyoming.

MINERALS

EXCHANGE. Thirty-seven specimens.

PURCHASED. One hundred and two specimens (William S. Vaux Collections).

SECOND VAUX-ACADEMY EXPEDITION TO GREENLAND, 1923. Five hundred specimens.

HARRY W. TRUDELL. Chalcopyrite, French Creek Mines, Penna.

ROCKS

SECOND VAUX-ACADEMY EXPEDITION: Collection of Greenland rocks.

APPARATUS

EDWARD GOLDSMITH. Babinet goniometer; Groth Universal Apparatus.

PURCHASED. Cooper-Hewitt mercury vapor arc.

ARCHEOLOGY

MR. JOHN L. BAER. Fifteen unfinished "banner-stones" from an aboriginal workshop on the Susquehanna River; and "riolite" rejects from an aboriginal quarry.

LOGAN MUSEUM, BELOIT COLLEGE (Exchange). Twenty-seven implements from Wisconsin.

MISS DOROTHY MALLON. Ethnological material from the Indians of British Guiana, Arizona, and California; also miscellaneous objects from Scandinavia and the Philippines.

R. R. MEADOWCROFT. Pima basket.

MR. CLARENCE B. MOORE. Shell artifacts, Florida Keys.

MR. JOHN REILLY. Eleven baskets, California and Mexico.

DR. RANDOLPH TAYLOR. Very old Indian basket.

Reports of Sections

REPORT OF THE BIOLOGICAL AND MICROSCOPICAL SECTION.—Eight stated meetings have been held during the year.

The Section, in conjunction with the Mineralogical and Geological Section, took part in numerous excursions to various localities near Philadelphia, for purposes of collection.

The following members made communications relating to new methods of research and the discovery of new species: Messrs. Hugo Bilgram, T. Chalkley Palmer, Walter Palmer, F. J. Keeley, Thomas S. Stewart, W. A. Poyser, and C. S. Boyer.

Dr. J. Cheston Morris died November 29. For many years he was active as Director of the Section and was one of its original founders. Appropriate resolutions have been adopted.

The following officers were elected for the year 1924:

Director.....T. Chalkley Palmer
Vice-Director.....John A. Shulze
Recorder.....Charles S. Boyer
Treasurer.....Thomas S. Stewart
Corresponding Secretary.....Walter Palmer
Conservator.....F. J. Keeley.

CHARLES S. BOYER,
Recorder.

ENTOMOLOGICAL SECTION.—The Entomological Section has held five of its stated meetings with an average attendance of ten persons. Interesting communications and exhibits have been made by several members and contributors. A field excursion was made, in May, to Castle Rock, which was enjoyed by the participants and was the means of adding materially to the Academy's collection. Mr. R. T. Davis was elected a Contributor. Mr. Philip Nell, elected a Contributor, March 26, 1891, died Nov. 7, 1923.

The following were elected to serve for 1924.

Director.....Philip Laurent
Vice-Director.....Roswell C. Williams, Jr.
Secretary.....James A. G. Rehn

Treasurer.....Ezra T. Cresson
Conservator.....Henry Skinner
Recorder.....Ezra T. Cresson, Jr.
Publication Committee: Ezra T. Cresson, Philip P. Calvert, and Ezra T. Cresson, Jr.

E. T. CRESSON, JR.,
Recorder.

MINERALOGICAL AND GEOLOGICAL SECTION.—Excursions, jointly with the Biological and Microscopical Section, continue to constitute the chief activities of the Section, and there were twenty-one such trips, with an average attendance of eighteen, visiting all the important geological formations of the district, and a number of well known mineral localities.

At the annual meeting, the following officers were elected to serve during the ensuing year:

Director.....F. J. Keeley
Vice-Director.....T. Chalkley Palmer
Treasurer.....Thomas S. Stewart, M.D.
Conservator.....George Vaux, Jr.
Recorder.....Samuel G. Gordon.

F. J. KEELEY,
Director.

ORNITHOLOGICAL SECTION.—The annual meeting of the Ornithological Section was held December 20, 1923, and the following officers elected for the ensuing year:

Director.....Spencer Trotter
Vice-Director.....Samuel N. Rhoads
Recorder.....Julian K. Potter
Secretary.....Wm. A. Shryock
Treasurer and Conservator.....Witmer Stone.

Library

ADMINISTRATION OF THE LIBRARY

LIBRARY COMMITTEE

WITMER STONE, *Chairman*, F. J. KEELEY
HENRY TUCKER T. CHALKLEY PALMER
SPENCER TROTTER.

SPENCER TROTTER, *Librarian.*
WILLIAM J. FOX, *Assistant Librarian.*

REPORT OF THE LIBRARIAN

The additions to the library during 1923 total 7083; of these 6179 are pamphlets and parts of periodicals, 734 volumes, 168 maps, and 2 photographs.

They came from the following sources:

Exchange	3572
Isaiah V. Williamson Fund	1954
United States Department of Agriculture	528
General Appropriation for Purchase of Books	411
Editors	45
Authors	36
Howard Fuguet	32
Charles Hedley (through Henry A. Pilsbry)	28
Pennsylvania Bureau of Topographic and Geological Survey	27
Pennsylvania State Library	24
Cornell University Agricultural Experiment Station	23
United States Department of Commerce	22
New York State College of Agriculture	21
Government of India	20
Commissão de Linhas Telegraphicas Estrategicas de Matto Grosso ao Amazonas	17
Publication Committee of the Academy	15
Miss Elizabeth Brown	15
Texas Agricultural Experiment Station	15
New York Agricultural Experiment Station	13
Amgueddfa Genedlaethol Cymru (National Museum of Wales)	13
Department of Archives and History, Alabama	12

United States Department of the Interior 11
American Entomological Society 11
Thomas B. Wilson Fund 10
Maryland Academy of Sciences 10
Nebraska State Board of Agriculture 9
Museum of the American Indian, Heye Foundation 8
Pennsylvania Museum and School of Industrial Art 8
Department of Agriculture, State of California 7
Indiana University 7
National Association of Marble Dealers 7
Vermont Agricultural Experiment Station 6
Pennsylvania Forestry Association 6
Institute of Economic Mineralogy and Petrography ("Lithogaea") 6
Wild Flower Preservation Society Washington D. C. Chapter 5
Oklahoma Geological Survey 5
Thoreau Museum of Natural History 4
Statens Skogsförsöksanstalt, Stockholm 4
Geological Survey of Nigeria 4
Biological Board of Canada 4
Henry A. Pilsbry 4
Iowa Geological Survey 3
Adam Hilger Ltd. 3
South Dakota Geological and Natural History Survey 3
National Research Council 3
Geological Survey of Alabama 3
Henry Gadeau de Kerville 3
State of New Jersey, Department of Agriculture 3
Secretario de Agricultura y Fomento, Mexico 3
New York. Conservation Commission 2
North Dakota Geological Survey 2
New York State Archaeological Association, Morgan Chapter 2
Mrs. F. H. Easby 2
Queensland Department of Mines 2
Cuerpo de Ingenieros de Minas del Peru 2
Canada. Department of the Interior 2
University of Stellenbosch 2
Delaware Valley Ornithological Club 2
Government of Tasmania 2
Zoological and Acclimatisation Society of Victoria 2
Acadian Entomological Society 2
Fisheries of New South Wales 2
United States War Department 1
Illinois Geological Survey 1
Kentucky Geological Survey 1
Massachusetts Agricultural Experiment Station 1
West Virginia Geological Survey 1

Union of South Africa Fisheries and Marine Biological Survey	1
Boston City Hospital	1
University of Montana	1
Nela Research Laboratory, General Electric Company	1
Federation of American Societies for Experimental Biology	1
Los Angeles County Museum of History, etc	1
New Jersey. Department of Conservation and Development	1
Colorado Museum of Natural History	1
Nijgh & Van Ditmar's Publishing Co., Rotterdam	1
Bermuda Biological Station for Research	1
Argentine Government	1
Samuel G. Gordon	1
Scientific Society of San Antonio	1
Morgan Hebard	1
San Francisco Bay Marine Piling Survey	1
C. W. Richmond	1
Clarence B. Moore	1
William J. Fox	1
Department of Trade and Customs, Australia	1
Zoological Society of Philadelphia	1
Japan Society	1
Warren Academy of Sciences	1
Nova Scotia. Department of Agriculture	1
Massachusetts. Division of Fisheries and Game	1
Royal Ontario Museum of Archaeology	1
Mrs. Julia Planton Estate	1
Pennsylvania State Highway Department	1
Maryland Geological Survey	1
Delaware County Institute of Science	1
Michigan Geological and Biological Survey	1
Jardin Botanique de l'État, Bruxelles	1
Tennessee State Geological Survey	1
George B. Wood	1
Michigan College of Mines	1
R. C. Williams, Jr	1
Scripps Institute for Biological Research	1
Francis W. Pennell	1
Islands Stiftisbokasafn	1
Board of Water Supply New York City	1

These have been distributed to the various departments of the library as follows:

Journals	5088
Agriculture	797
Geology	567

Geography	127
Botany	118
Voyages and Travels	108
General Natural History	95
Anthropology	51
Entomology	20
Ornithology	18
Anatomy and Physiology	17
Ichthyology	16
Mineralogy	12
Physical Sciences	11
Conchology	6
Helminthology	5
Bibliography	4
Mammalogy	4
Herpetology	3
Chemistry	3
Medicine	3
Miscellaneous	10

In the list of new journals added during the year will be found several important Italian publications, long out of print. Other valuable accessions are: Phillips, *Natural History of the Ducks,* and a set of *Early Western Travels 1748–1846,* by Reuben Gold Thwaites, 32 volumes, presented by Mr. Howard Fuguet.

Nine hundred and twenty-four volumes have been bound, and 13 repaired.

Twenty-five volumes and 163 pamphlets were transferred to the Free Library of Philadelphia, not being of interest to the Academy's library.

Two hundred and twenty-three volumes were borrowed by members; and 1495 were used on the premises by the scientific staff.

The following new journals and transactions were added to the library either by exchange or purchase:

Accademia del Cimento, Atti e Memorie, 3 v. Firenze, 1780.
Accademia Italiana di Scienze, Lettere ed Arti, Atti, 1 vol. Livorno, 1810.
Accademia di Scienze, Lettere ed Arti di Padova, Memorie. 1 vol. 1809.
Acta Phytochimico. Tokyo.
Abhandlungen zur Naturgeschichte, Physik und Oekonomie. 1 vol. Leipzig, 1779–80.
Alaska Agricultural Experiment Station. Circular.
Amgueddfa Genedlaethol Cymru (National Museum of Wales). Annual Reports.

Annales Géologiques de la Péninsule Balkanique. Belgrad.
Annali Scientifici. Giornale di Science fisiche, matematici, etc. 3 vols. Napoli, 1854–57.
Arbeiten aus dem Gebiete der experimentellen Biologie. Berlin.
Archivo de Medicina Legal. Lisboa.
Association des Naturalistes de la Vallée du Loing, Bulletin.
Bernice Pauahi Bishop Museum. Bulletin.
British Journal of Experimental Biology.
Biological Review of Ontario.
Biologisches Institut München. Arbeiten.
Botanical Survey of South Africa. Memoir.
Botanisches Centralblatt f. Deutschland. 1846.
Bulletin de Vulgarisation des Sciences Naturelles (Société Botanique et Entomologique du Gers).
Charleston Museum Quarterly.
Congrès Coloniaux Nationaux. Congrès de la Production Coloniale, Comptes Rendus et Rapports.
Congreso Cientifico Jeneral Chileno de 1894.
Brebissonia. 4 vols. Paris, 1878–82.
China (The) Journal of Science and Arts.
Congresso Internazional Botanico. 1 vol. Firenze, 1870.
Danmarks Geologiska Undersogelse.
Department of Fisheries. Bulletin of the Ceylon Fisheries. Ceylon.
Department of the Interior, Canada. Forestry Bureau. Tree Pamphlet.
Dominion Museum Monograph. Wellington, N. Z.
Fish (The) Culturist. Philadelphia.
Fishery Board for Scotland. Scientific Investigations.
Folia Anatomica Japonica. Yotsuya.
Geological and Natural History Reportory and Journal of Prehistoric Archaeology and Ethnology. London, 1865–67.
Geological Society of China. Bulletin. Palaeontologica Sinica.
Geologisches Heft. Königsberg Pr.
Giornale (e Nuova Giornale) d'Italia spettante alla Scienze naturale, etc. 26 vols. 1765–95.
Gray Herbarium of Harvard University, Contributions. New Series.
Hornero (El). Buenos Aires.
Imperiale Regio Istituto del Regno Lombardo-Veneto, Memorie, v. 1, 2, 5 (1812–38).
Indian Botanical Society. Journal.
Institut Colonial de Marseille. Mémoires et Rapports sur les Matières Grasses.
Institute of Economic Mineralogy and Petrography, Moscow. Transactions.
Istituto Zoologico della R. Università di Roma, Bollettino.
Japanese Journal of Chemistry, Tokyo.
Japanese Journal of Zoology, Tokyo.
Kommissionen for Havundersogelser, Meddelelser. Copenhagen.
Královské Ceské Spolecnosti, Vijnocni Zprava.

Kungl. Kommerskollegium, Stockholm. Beskrivningar över Mineral fyndigheter.
Leeds Geological Association. Transactions.
Magazin for Naturvidenskaberne. Christiana, 1823–33.
Malayan Branch of the Royal Asiatic Society. Journal
Maryland Academy of Sciences, Annual Report. Bulletin.
Mediterranean Naturalist. 3 vols. 1891–93.
Memorie sopra la Fisica e Storia Naturale di diversi valentuomini. 4 vols. Lucca, 1743–57.
Michigan Academy of Sciences, Arts and Letters, Papers.
Mineral Messenger. Moscow.
Mitteilungen aus den Gebiete der Naturwissenschaften und der Technik. Braunschweig.
Museen f. Tierkunde u. Volkerkunde zu Dresden, Abhandlungen und Berichte
Natura. Rivista di Scienze Naturali. Milano.
Nature Magazine. Washington.
Naturwissenschaftliche Korrespondenz. Leipzig.
Natuurwetenschappelij Tijdschrift. Antwerpen.
New South Wales Department of Mines Geological Survey. Bulletin.
Nigeria. Geological Survey of Nigeria. Memoirs.
North Dakota Geological Survey. Bulletin.
Pamietnik Fizjograficzny. Warsaw.
Poznanskie Towarzystwo Przyjaciol Nauk, Prace Komisji Matemat.—Przyrodniczej. Poznan.
Priroda. Petrograd.
Prirodovedecká Spolecnost v Moravské Ostrave, Zbornik.
Reale Accademia delle Scienze e Belle Lettere di Napoli dalla Fondazione all'a 1787.
Reale Accademia delle Scienze, sezione della Società Reale Borbonica di Napoli. 6 vols. 1819–51.
Revista Mexicana de Biologia.
Rice Institute Pamphlet. Houston.
Rivista di Fisica, Matematici e Scienze Naturali. 26 vols. Pavia and Pisa, 1900–1912.
Rivista Italiana di Scienze Naturali e loro Applicazioni. 2 vols. Napoli, 1885–86.
Royal Ontario Museum of Archaeology. Bulletin.
Schlesische Gesellschaft f. vaterländische Kultur, Beihefte zu den Jahres berichten (later: Schlesische Jahrbücher f. Geistes und Naturwissenschaften.)
Schweiz. Gesellschaft f. Urgeschichte (Société Suisse de Préhistoire), Jahresbericht.
Sociedad Argentina de Ciencias Naturales, I Reinuon Nacional 1916.
Sociedad de Estudios Biologicos, Boletin. Mexico.
Sociedade Brasileira de Sciencias, Revista.
Societas Scientiarum Fennica, Commentationes Biologicae. Commentationes Physico-Mathematicae.
Société d'Agriculture, Sciences, Arts et Commerce du Puy, Annales.
Société d'Histoire Naturelle de Toulon, Annales.

Société des Sciences Naturelles du Maroc. Bulletin, Mémoires.
Société Vaudoise des Sciences Naturelles. Mémoires.
Southern Rhodesia Geological Survey. Bulletin.
Stacji Hydrobilogogicnej na Wagrach im. M. Nenckiego, Prace; Sprawozdania.
Tasmania. Department of Mines Geological Survey, Bulletin; Mineral Resources; Record; Reports; Underground Water Supply Paper.
Through the Ages. Baltimore.
Trinity College, Dublin, Notes from the Botanical Laboratory,
Umschau (Die). Frankfurt a. M.
United States Department of Agriculture, Statistical Bulletin.
Universidad Nacional de La Plata, Revista la Facultad de Ciencias Quimicas.
University of Minnesota, Annual Report of the Zoological Museum.
University of Nebraska. Science Reports.
University of Stellenbosch. Annals.
Verein f. naturwissenschaftliche Erforschung des Niederrheins, Abhandlungen.
Waseda University, Memoirs of the College of Science and Engineering.
Wesley (The) Naturalist. Vol. 1. London.
Wild Flower Preservation Society Washington D. C. Chapter, Circular.
Zeitschrift f. Schädlingsbekämpfung. Berlin.

The Librarian wishes to acknowledge his appreciation of the important and valuable work of Mr. William J. Fox, Assistant Librarian, in the care of the library, and also of the help constantly rendered by Miss H. Newell Wardle.

SPENCER TROTTER,
Librarian.

Publications

PUBLICATION COMMITTEE

The PROCEEDINGS for 1923 has been published as far as page 354, with 24 plates; and the remainder of the volume will include approximately 50 pages, and 3 plates, making a total of over 400 pages and 27 plates. The reprints of the papers now printed have been distributed in order to obtain a date of issue.

The ANNUAL REPORTS for 1922, consisting of 98 pages and 8 plates, have been printed and distributed to members.

The ENTOMOLOGICAL SECTION of the Academy has published ENTOMOLOGICAL NEWS, 320 pages and 6 plates; and 314 pages and 17 plates have been issued of the TRANSACTIONS by the American Entomological Society, with another part containing approximately 40 pages in the press.

Under the editorship of Dr. Henry A. Pilsbry, Part 106 of the MANUAL OF CONCHOLOGY, 48 pages and 6 plates, has been issued.

WILLIAM J. FOX,
Secretary of the Committee.

Secretaries

REPORT OF THE RECORDING SECRETARY

During the past year six meetings of the Academy have been held, the dates being December 19, 1922; January 16, February 20, March 20, April 17 and November 20, 1923. The average attendance at the meetings was nineteen members and eighteen visitors. Communications were made by Dr. Horace Burrington Baker, Dr. Joseph Bequaert, Dr. Francis W. Pennell and James A. G. Rehn.

By action of the Council of the Academy, taken at its meeting of May 1, 1923, the hour of the stated meetings of the Academy was changed from eight in the evening to four in the afternoon, effective with the meeting of November 20. Notice of the change of hour was mailed to all Academy members on May 8, 1923.

During the past year twenty-five members have died and six have resigned. The losses by death included: Walter Horstmann, for many years a member of the Council and also member of a number of Academy committees including that on Accounts; Alexander Mac Elwee, for some years Vice-Director of the Botanical Section; Dr. James Cheston Morris, who became a member of the Academy in October, 1854 and was for many years Director of the Biological and Microscopical Section; Mrs. Beulah Morris Rhoads, a Sustaining Member, elected a member December 28, 1875, and who during the many years of her association with the Academy evidenced her interest by assisting many of its undertakings.

The following individuals were elected members: Mrs. Carrie B. Aaron, Miss Gertrude Abbott, Dr. W. H. F. Addison, Miss Willian Adger, Dr. Charles H. Arndt, Dr. Horace Burrington Baker, Dr. Michael Thomas Barrett, Robert Biddle, Mrs. Thomas F. Branson, Mrs. John A. Brown, Jr., George R. Camp, F. J. Chesterman, Leander C. Claflin, Dr. Henry S. Conard, Thomas Pennington Conard, Mrs. Orlando Crease, Lewis M. Dorsey, Jr., Mrs. William P. Gest, Charles S. Hebard, Dr. Addinell Hewson, Dr. Harold W. How, Theodore F. Jenkins, George J. Kreier, C.

Albert Kuehnle, W. W. Lamborn, Mrs. Anna P. Mattix, William Maul Measey, Alfred Mellor, Arthur W. Pusey, Montagu A. Phillips, J. Bunford Samuel, Countess of Santa Eulalia, Addison H. Savery, Edward M. Sayen, Jr., W. Hinckle Smith, John A. Snyder, Francis J. Stokes,, Harry C. Trexler, Horace Walton, Dr. J. Edward Whitfield, Mrs. Albert Wolf, Biddle Wood. Junior Members: Arthur Howell Gerhard, Jr., Alexander H. Leighton.

In appreciation of their gifts to the Academy for special purposes, by action of the Council, Mr. George L. Harrison, Jr., and Dr. R. A. F. Penrose, Jr., were designated Sustaining Members.

The dissolution of the Botanical Section was reported at the meeting of December 19, 1922. The reasons for the dissolution were stated to be that the care of the herbarium is now fully assumed by the Academy, and the meetings of the Philadelphia Botanical Club fill all needs for furthering the study of local plants.

Upon the recommendation of the Committee on Hayden Memorial Geological Award, the Hayden Medal for 1923 was awarded to Professor Alfred Lacroix, President of the Geological Society of France. An appropriate notice of the award and a summary of Professor Lacroix's contributions will be published in the "Proceedings" of the Academy. The Hayden Medal was transmitted to Professor Lacroix through the kind offices of the Ambassador of the French Republic at Washington.

On December 6, 1923,[1] there was held a centenary commemoration of the birth of Joseph Leidy, in conjunction with the American Association of Anatomists, the American Entomological Society, the American Philosophical Society, the American Society of Naturalists, Boston Society of Natural History, the College of Physicians of Philadelphia, National Academy of Sciences, Smithsonian Institution, Swarthmore College, University of Pennsylvania, Wagner Free Institute of Science, Wistar Institute of Anatomy and Biology and the Zoological Society of Philadelphia.

Two sessions were held in the afternoon in the Lecture Hall of

[1] The Leidy Centenary was actually held at the beginning of the Academy year 1924, but as the committee-in-charge virtually completed its work before November 30, 1923, and the Academy's participation in the commemoration, financial and otherwise, was determined and arranged within the time covered by this report, its notice here seems proper. (J. A. G. R.)

the Academy and one in the evening in Mitchell Hall of the College of Physicians of Philadelphia. Nearly one hundred delegates represented many learned societies and related organizations at the sessions, while the number of those in attendance at one time reached four hundred and fifty.

The addresses of the afternoon sessions were as follows:

"Opening Remarks," by the Honorary Chairman, Dr. R. A. F. Penrose, Jr., President of the Academy; "General Estimate of Leidy's Influence upon Scientific Thought and Development," by Dr. Edward S. Morse, of the Peabody Academy of Science; "Zoological Work," by Dr. Herbert S. Jennings, of Johns Hopkins University; "Palaeontological and Geological Work," by Dr. William B. Scott, of Princeton University; "Joseph Leidy as a Botanist," by Dr. Witmer Stone, of the Academy; and "Mineralogical Work," by Dr. Frank W. Clarke, of the United States Geological Survey.

In the evening session, the Centenary addresses were: "Reminiscences of a Prosector and Appreciation of Dr. Leidy's Work as an Anatomist," by Dr. George E. de Schweinitz, of the University of Pennsylvania, and "Leidy and His Influence on Medical Science," by Dr. Hobart A. Hare, of Jefferson Medical College. "The Joseph Leidy Lecture in Science," under the University of Pennsylvania Foundation, was also delivered at the evening session by Dr. Henry Fairfield Osborn, President of the American Museum of Natural History.

Announcement was made at one of the afternoon sessions of the Leidy Centenary of the establishment of "The Joseph Leidy Memorial Fund," as a trust with the Academy. This fund, which is the gift of Dr. Joseph Leidy, II, in memory of his distinguished uncle, provides for the award of a bronze medal every three years, accompanied by an honorarium, "as a reward for the best publication, exploration, discovery or research in the Natural Sciences in such particular branches thereof as may be designated." The trust was accepted by the Council of the Academy at its meeting of December 4, 1923. (See Plate.)

A Central Office to handle the accounts of the Treasurer, the details of Secretarial office matters, and general business of the Academy, having been authorized by the Council in 1922, in Janu-

FACSIMILE OF THE JOSEPH LEIDY MEMORIAL MEDAL

ary 1923, that body directed the organization of the office and its establishment in the rooms at the east end of the first floor of the North Building. On February 15, 1923 the office assumed the current accounts of the Academy from the Girard Trust Company, with a staff of a Bursar (in charge) and one stenographer, under the general direction of the Recording Secretary. In June, the Curators transferred the telephone switchboard to the office and an operator was employed. On December 1, 1923, following the instruction of the Council, the stenographic work of the Curators was taken over by the office, the object in view being the concentration of such work in one place and having a staff working in coördination.

The Central Office now furnishes a place for the general public to secure information, acts as an intermediary between callers and the scientific staff, thus saving much valuable time of our technical staff, attends to all the official correspondence of the institution, keeps the Treasurer's books, the membership files, general records, orders supplies and keeps records of the orders, distributes notices, reports and special information, and gives attention to innumerable clerical matters. The necessity for such an office has been apparent for years, and the first year of its operation shows conclusively its worth to the Academy,—in the prompt handling of its business and scientific staff correspondence, and in relieving the officers of what has often been purely clerical routine. The Recording Secretary wishes to place on record his appreciation of the earnest coöperation of the staff of the Central Office. The organization of its work was largely accomplished by our first Bursar, Miss Florence E. Franck, now ably succeeded by Miss Dorothy F. Palmer. We have been most fortunate in having an office staff interested in the Academy and its work, and taking a pride in the institution and what it represents in the scientific world and in the community.

JAMES A. G. REHN,
Recording Secretary.

REPORT OF THE CORRESPONDING SECRETARY

The decease of the following named correspondents was announced during the year: David Sharp, Oscar Hertwig, William C. Roentgen, Hermann Grenacher, Robert Wiedersheim, Nathaniel Charles Rothschild, and Friedrich Czapek.

Correspondents elected were: Charles William Andrews, Marcellin Boule, Friedrich Czapek, Herman L. Fairchild, Stephen A. Forbes, Battista Grassi, Ignacio Bolivar, Lewis R. Jones, Vernon Kellogg, Charles A. Kofoid, Alfred Lacroix, James Playfair McMurrich, George P. Merrill, James G. Needham, Charles C. Nutting, W. J. V. Osterhout, and Reginald C. Punnet.

The Hayden Memorial Geological Medal for 1923 awarded by the Academy to Professor Alfred Lacroix of Paris, especially in recognition of his distinguished work in petrography, was completed early in the year, and transmitted to Professor Lacroix through the courtesy of His Excellency, M. Jules Jusserand, the Ambassador of the French Republic at Washington.

Invitations were received to the Boston meeting of The American Association for the Advancement of Sciences, our delegates to which were Philip P. Calvert, Roswell C. Williams, Jr., and Henry A. Pilsbry; the fiftieth anniversary of the Polish Academy of Sciences and Letters; the project for establishing a memorial to Giovanni Capellini; the inauguration of Stratton Duluth Brooks as President of the University of Missouri; the Second Pan-Pacific Scientific Conference in Australia, to which, through the generosity of friends of the Academy and of Dr. Pilsbry it was possible to send Henry A. Pilsbry as a delegate; and others. When the Academy found it impossible to appoint delegates, suitable acknowledgments were sent.

At the request of the Joseph Leidy Centenary Committee, the Corresponding Secretary also directed the sending of invitations to a selected list of institutions of scientific research and learning, and conducted the correspondence relating to the appointment and invitation of delegates.

The statistics of routine correspondence follow:

Communications received:

Acknowledging the receipt of the Academy publications	112
Transmitting publications to the Academy	74
Requesting exchanges, or the supply of deficiencies	42
Photographs and biographical sketches of correspondents	15
Invitations to learned gatherings, etc	8
Notices of deaths of scientific men	4
Circulars concerning the administration of scientific and educational institutions	20
Letters from Correspondents and miscellaneous letters	407
Total received	682

Communications forwarded:

Acknowledging gifts to the Library	587
Requesting the supply of deficiencies or exchange of publications	563
Acknowledging gifts to the Museum	95
Acknowledging photographs and biographies of correspondents	13
Letters of sympathy or congratulation, addresses, etc	9
Diplomas of correspondents and delegates' credentials	38
Miscellaneous letters	380
Annual Reports to correspondents	177
Total forwarded	1862

J. PERCY MOORE,
Corresponding Secretary.

CENTRAL OFFICE

Bursar: Dorothy F. Palmer.

Treasurer

SUMMARY OF THE ACCOUNTS OF GEORGE VAUX, JR., TREASURER OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, FOR THE FISCAL YEAR ENDED NOVEMBER 30, 1923

GENERAL FUND

RECEIPTS

Balance on hand 29th November, 1922	$ 475.75	
Income from Investments	43,049.84	
Income from the Estate of John Turner	148.47	
Annual Dues	3,878.00	
Interest on Bank Balances	570.26	
Publications sold	849.07	
Miscellaneous Refunds and Receipts	234.46	$49,205.85
Transfers from Special Funds:		
For Curatorial Expenses		
Mary R. D. Smith Fund	$ 325.00	
Horace N. Potts Fund	1,000.00	
Aubrey H. Smith Fund	4,000.00	
General Endowment Fund	900.00	
Special Donations Fund	874.00	
Conchological Section Fund	2,000.00	
For Other Purposes		
Mary Jeanes Museum Fund for Museum Expenses	875.00	
Thomas B. Wilson Fund for Librarian's Salary	400.00	
Special Donations Fund	275.00	10,649.00
		$59,854.85

PAYMENTS

Curator's Department		
Salaries	$33,081.42	
Museum Cases	611.01	
Specimens and Expeditions	572.35	$34,264.78

Librarian's Department		
Salaries	$ 2,299.92	
Office Expenses	149.27	
Purchase of Books	1,566.63	
Binding of Books	1,455.40	5,471.22
Forward		$39,736.00
Publications		
Printing "Proceedings"	$ 1,242.84	
Printing "Annual Report"	104.47	
Office Expenses—Publication Committee	211.01	
Salaries—Publication Committee	1,800.00	3,358.32
General		
General Expenses including fuel, light, water and building repairs	$ 6,719.79	
Recording Secretary's salary and expenses	847.07	
Corresponding Secretary's expenses	50.00	
Treasurer's Department Expenses	445.67	
Mary S. Warren on account of 1309 Arch Street	1,800.00	
Removal of Botanical Department	1,081.58	
Portion of Central Office Equipment	440.87	
Contribution to Joseph Leidy Commemoration	200.00	11,584.98
		$54,679.30
Balance November 30, 1923		5,175.55
		$59,854.85

CONCHOLOGICAL SECTION FUND

RECEIPTS

Balance November 29th, 1922	$ 351.93
Net Income from Investments	1,244.52
Balance November 30th, 1923—Overdrawn	403.55
	$2,000.00

PAYMENTS

Transferred to General Fund for Curatorial Expenses	$2,000.00
	$2,000.00

COPE COLLECTION FUND

RECEIPTS

Balance November 29th, 1922	$3,930.87
Net Income from Investments	859.33
	$4,790.20

PAYMENTS

Transferred to Principal for Investment	$3,953.93
Balance November 30th, 1923	836.27
	$4,790.20

F. V. HAYDEN MEMORIAL FUND

RECEIPTS

Balance November 29th, 1922	$ 153.45
Net Income from Investments	102.12
Balance November 30th, 1923—Overdrawn	29.43
	$ 285.00

PAYMENTS

For Hayden Memorial Medal	$ 285.00
	$ 285.00

HORACE N. POTTS FUND

RECEIPTS

Balance November 29th, 1922	$ 779.34
Net Income from Investments	275.32
	$1,054.66

PAYMENTS

Transferred to General Fund for Curatorial Expenses	$1,000.00
Balance November 30th, 1923	54.66
	$1,054.66

MARY JEANES MUSEUM FUND

RECEIPTS

Balance November 29th, 1922	$ 4.49
Net Income from Investments	828.38
Balance November 30th, 1923—Overdrawn	42.13
	$ 875.00

PAYMENTS

Transferred to General Fund for Museum Expenses	$ 875.00
	$ 875.00

JESSUP FUND—MALE BRANCH

RECEIPTS

Balance November 29th, 1922	$ 9.58
Net Income from Investments	649.82
	$ 659.40

PAYMENTS

Salaries to Students	$ 625.00
Balance November 30th, 1923	34.40
	$ 659.40

JESSUP FUND—FEMALE BRANCH

RECEIPTS

Balance November 29th, 1922	$ 75.35
Net Income from Investments	222.69
	$ 298.04

PAYMENTS

Salaries to Students	$ 250.00
Balance November 30th, 1923	48.04
	$ 298.04

J. A. MEIGS LIBRARY FUND

RECEIPTS

Net Income from Investments	$ 615.51
	$ 615.51

PAYMENTS

Balance November 29th, 1922—Overdrawn	$ 570.38
Balance November 30th, 1923	45.13
	$ 615.51

J. H. REDFIELD MEMORIAL FUND

RECEIPTS

Balance November 29th, 1922	$ 540.43
Net Income from Investments	166.88
	$ 707.31

PAYMENTS

Purchase of Botanical Specimens	$ 248.12
Balance November 30th, 1923	459.19
	$ 707.31

MARY REBECCA DARBY SMITH FUND

RECEIPTS

Balance November 29th, 1922	$ 256.05
Net Income from Investments	71.40
	$ 327.45

PAYMENTS

Transferred to General Fund for Curatorial Expenses	$ 325.00
Balance November 30th, 1923	2.45
	$ 327.45

AUBREY H. SMITH FUND

RECEIPTS

Balance November 29th, 1922	$3,216.68
Net Income from Investments	735.36
Balance November 30th, 1923—Overdrawn	47.96
	$4,000.00

PAYMENTS

Transferred to General Fund for Curatorial Expenses	$4,000.00
	$4,000.00

FRANCIS LEA CHAMBERLAIN FUND

RECEIPTS

Balance November 29th, 1922	$ 702.04
Net Income from Investments	110.68
Balance November 30th, 1923	$ 812.72

THOMAS B. WILSON FUND

RECEIPTS

Balance November 29th, 1922	$ 2.81
Net Income from Investments	489.77
	$ 492.58

PAYMENTS

Books Purchased	$ 90.00
Transferred to General Fund for Librarian's Salary	400.00
Balance November 30th, 1923	2.58
	$ 492.58

WILLIAM S. VAUX FUND

RECEIPTS

Balance November 29th, 1922	$ 640.74
Net Income from Investments	518.86
Duplicate Minerals Sold	6.50
	$1,166.10

PAYMENTS

Minerals Purchased	$1,070.93
Balance November 30th, 1923	95.17
	$1,166.10

I. V. WILLIAMSON FUND

RECEIPTS

Balance November 29th, 1922	$ 248.22
Net Income from Investments	1,837.72
	$2,085.94

PAYMENTS

Books Purchased	$1,830.69
Balance November 30th, 1923	255.25
	$2,085.94

J. F. BEECHER MEMORIAL LABORATORY FUND

RECEIPTS

Balance November 29th, 1922	$4,060.07
Net Income from Investments	981.66
	$5,041.73

PAYMENTS

Transferred to Principal for Investment	$4,060.07
Balance November 30th, 1923	981.66
	$5,041.73

GENERAL ENDOWMENT FUND

RECEIPTS

Balance November 29th, 1922	$ 733.14
Net Income from Investments	179.30
	$ 912.44

PAYMENTS

Transferred to General Fund for Curatorial Expenses	$ 900.00
Balance November 30th, 1923	12.44
	$ 912.44

SPECIAL DONATIONS FUND

GENERAL PURPOSES

Balance on hand November 29, 1922	$ 211.33
William S. Meigs	75.00
Balance on hand November 30th, 1923	$ 286.33

CONTRIBUTIONS FOR ARCHAEOLOGICAL CASES

Balance on hand November 29th, 1922	$ 424.00
A Friend	450.00
Balance on hand November 30th, 1923	$ 874.00

CONTRIBUTIONS FOR PURCHASE OF BIRDS

Balance on hand November 29th, 1922	$ 200.00
Balance on hand November 30th, 1923	$ 200.00

CONTRIBUTIONS TOWARD 1922 EMERGENCY FUND FOR SPECIMENS, EXPEDITIONS, CASES AND PUBLICATIONS

RECEIPTS

Balance on hand November 29th, 1922	$1,360.25
Morgan Hebard	759.00
K. K. McKenzie	100.00
Cash	60.00
Philip P. Calvert	75.00
Transferred from Museum Cases to close Fund	72.75
	$2,427.00

PAYMENTS

Disbursed	$2,427.00
	$2,427.00

CONTRIBUTIONS FOR CENTRAL OFFICE EXPENSES

RECEIPTS

George L. Harrison, Jr.	$1,000.00
R. A. F. Penrose, Jr.	1,050.00
Morgan Hebard	250.00
T. Chalkley Palmer	500.00
George Vaux, Jr.	50.00
	$2,850.00

PAYMENTS

Disbursed	$2,850.00
	$2,850.00

CONTRIBUTIONS FOR INCREASE IN JANITORS' SALARIES FOR 1923

RECEIPTS

R. C. Williams, Jr.	$ 100.00
Thomas S. Gates	50.00
Philip P. Calvert	50.00
William E. Hughes	20.00
Henry Skinner	100.00
Spencer Trotter	150.00
M. J. Greenman	25.00
	$ 495.00

PAYMENTS

Disbursed	$ 495.00
	$ 495.00

CONTRIBUTIONS FOR 1923 ORTHOPTERA FIELD FUND

RECEIPTS

R. A. F. Penrose, Jr.	$ 300.00
William Henry Trotter	50.00
Mrs. Charles Hebard	100.00
Mr. and Mrs. John W. Schell	25.00
	$ 475.00

PAYMENTS

Disbursed	$ 475.00
	$ 475.00

CONTRIBUTIONS FOR PAN-PACIFIC CONFERENCE IN 1923 DELEGATE FUND

RECEIPTS

George L. Harrison, Jr.	$ 25.00
John Cadwalader	50.00
R. A. F. Penrose, Jr.	300.00
A Friend	50.00
T. Chalkley Palmer	50.00
A Friend	500.00
	$ 975.00

PAYMENTS

Disbursed	$ 975.00
	$ 975.00

CONTRIBUTIONS FOR PUBLICATION GUARANTEE FOR ZOOLOGICAL SOCIETY OF LONDON

Philip P. Calvert	$ 100.00
	$ 100.00

Respectfully submitted,

GEORGE VAUX, JR.,
Treasurer.

E. and O. E.
Philadelphia,
December 10th, 1923.

As the result of an audit made by us of the books and accounts of The Academy of Natural Sciences of Philadelphia, we hereby certify that the above statement is in accord therewith and in our opinion correctly reflects the results of the financial activities during the period indicated.

(Signed) EDWARD P. MOXEY & CO.
Certified Public Accountants.

Philadelphia, Pa.,
December 17th, 1923.

REPORT OF THE TREASURER OF THE MANUAL OF CONCHOLOGY

The Treasurer of the "Manual of Conchology" respectfully reports

Receipts from all sources, for the year ending Nov. 30, 1923	$ 884.84
And disbursements	293.60
Balance	$ 591.24
Which added to balance Nov. 30, 1922	1,614.94
Leaves total cash on hand	$2,206.18

The receipts were as follows:

From Subscriptions, Vol. XXVI	$ 34.70
" " Vol. XXVII	401.78
" Sale of earlier Volumes	412.22
" Interest on daily Bank Balances	36.14
	$ 884.84

The disbursements were:

For Lithographing and Engraving	$ 87.62
" Paper and Printing	155.10
" Binding	18.00
" Postage, Advertising, etc.	13.63
Transfer of Cash from Deposit, Account Wesley and Son, London	19.25
	$ 293.60

There has been no change in the "Publications Trust" Account, and the balance remains $2,730.19, as last year. The Publication Committee of the Academy continues to assume payment of salary of Editor as heretofore.

Respectfully submitted,

S. RAYMOND ROBERTS,
Treasurer.

December 18, 1923.

Examined and found correct,

R. C. WILLIAMS, JR.,
Chairman, Committee on Accounts.

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OF

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FOR THE YEAR ENDING DECEMBER 31, 1924

PHILADELPHIA
1925

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of

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1924

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Report of the President

Changes of a fundamental character have been made in the administrative organization of the Academy during the past year and it therefore seems proper to give a brief summary of the causes that required them.

In the year 1812 a small group of men in Philadelphia who were interested in the natural sciences formed a society to pursue their investigations and discussions. In 1817 this society was incorporated under the laws of the State of Pennsylvania as The Academy of Natural Sciences of Philadelphia. In the following year a document containing the act of incorporation and what was called a "constitution" was published, the latter being only a few very brief rules to guide the new society and really representing a small code of by-laws.

In later years documents relating to the management of the Academy were entitled "act of incorporation and by-laws," and they became its sole organization. No form of a more or less elaborate constitution, separate and distinct from the act of incorporation and by-laws, such as exists in many other scientific societies, was ever adopted by the Academy. The by-laws therefore have always been more important than in other societies, because they have been the main instrument controlling its operations.

The act of incorporation of the Academy has been amended twice in the history of the society in order to adapt it to changing conditions. The by-laws have been amended in many and various ways from generation to generation, with the result that some of the clauses became contradictory or impossible of enforcement because they conflicted with the older rules. The Academy functioned under these by-laws by precedent and mutual understanding, not by any rigid interpretation of them.

The early management of the Academy was in the hands of the officers, among whom were included four curators. The latter under the by-laws acted as a board in conducting some of the administrative affairs of the society. In later years as the Academy increased its activities in different branches of science a larger

administrative body known as the council was formed, and the board of curators was retained to co-operate with it. The Academy, however, still continued to grow and to become more intricate in its operations, until even with the best efforts of the council and the curators it was rapidly failing to function in an efficient manner, thus interfering seriously with the original research and thought which had made it renowned both in America and in all other parts of the civilized world.

On account of these difficulties the council determined early in 1924 to amend the charter and totally to revise the by-laws, in hopes of accomplishing better results. The form of administration by the council and curators was abolished. A new governing body known as the board of trustees was created, and a new council, corresponding to the museum board in other scientific societies, was established. The board of trustees was to have charge of all the administrative and financial affairs of the society, while the council was to act in matters relating directly to the pursuits of the scientific staff. A new position of director of the museum was also created.

The work on these changes began in March, 1924, and the legal and other details required to put them into effect consumed the rest of that year. Many meetings of the general membership of the Academy, representing the corporation, had to be called to act in accordance with the tedious methods of procedure prescribed in the old by-laws regulating amendments. The revised by-laws of today are practically a new code and were finally accepted by the Academy in November, 1924.

On Frebruary 17, 1925, the first annual meeting under the new by-laws was held and the officers and the board of trustees were duly elected. On the same day the board of trustees met to appoint members of the scientific staff and to make provision for the proper co-operation between the board and the council. This general change of organization is now in full force and has operated up to the present time for the greater efficiency and more active progress of the Academy. All the different steps taken in accomplishing it are given in detail in the carefully prepared report of the recording secretary, and need not be repeated here.

R. A. F. PENROSE, JR.,
President

Report of the Recording Secretary

The year 1924 marked an epoch in the history of the Academy, as during that period imperatively needed changes in the organization of the institution were made possible. These involved a change in the Charter and a complete revision of the By-Laws.

As the outgrowth of a discussion at the Council meeting of March 4, 1924, a committee was appointed by the President to give full attention to the desirability of a revision of the Charter and By-Laws, and at the meeting of the Council held May 6, 1924, a report from the committee was submitted. The salient features of this report were as follows: That the Academy should have a President, a Vice-President, a Secretary, a Treasurer, and a governing board known as the Board of Trustees. This Board should have the power to appoint a scientific board to be known as the Council, and also such other boards, committees and officers as it considered desirable. The Board of Trustees should meet at such times as it deemed necessary and in any case not less than four times yearly. The Council should report its activities at intervals to the Board of Trustees, and at least not less than at the four meetings yearly of that Board. The Board of Trustees should have charge of the administrative affairs of the Academy, except when it delegated certain duties to the Council or others; and the Council should have the direction of the scientific affairs of the Academy, subject to such control as the Board of Trustees from time to time might believe desirable.

The report of this committee was accepted by the Council, which at once proceeded to carry into effect the recommendations of the committee; first, by adopting a resolution for submission to the Academy recommending the presentation of a petition to the Court of Common Pleas for the amending of Section Four of the Charter; second, by appointing a committee of one, consisting of the President, to prepare a new draft of By-Laws for submission to the Academy.

At its meeting of May 20, 1924, the Academy adopted the resolution submitted by the Council relative to the petitioning of the Court of Common Pleas for the necessary Charter change. Signed

endorsements of the resolution from three hundred and thirty-two members not present at the meeting, as well as the thirty-two present, were reported, and the officers were authorized and directed to take any and all steps advised by our Solicitor as desirable or necessary for securing the approval by the Court of the desired change. On July 7, 1925 the Court of Common Pleas of Philadelphia County approved the plea of the Academy, to have Section Four of its Charter amended to read as follows:

Sec. 4. The society shall have a president, a vice-president, a secretary, a treasurer and a managing board consisting of not less than five and not more than fifteen members, the exact number and their respective terms of office to be fixed by the By-Laws. The board shall have the power of appointing other officers and of creating other boards and committees subject to its jurisdiction.

The action of the Court was reported to the Academy by our Solicitor, Mr. Vaux, at the meeting of September 23.

Special provisions existing in the old By-Laws having necessitated an unusual and quite lengthy process for the amending of Article IV, Chapter I, of that code, at the meeting of May 20, 1924, a proposition to amend this article by striking it out was presented and automatically referred to the Council for examination. At the meeting of June 10, 1924 the favorable report of the Council on the proposition was received and, as a requirement of the situation, the third Tuesday of November, 1924, was fixed as the date for final consideration of this matter. During the intervening months the complicated provisions for amending this article, covering specified advertising and notification, were fully complied with, thus permitting definite action on the remaining articles and sections of the By-Laws.

At the meeting of September 23, 1924 the draft of the new code of By-Laws, prepared by the President, was read, and automatically referred to the Council for consideration and report. On October 14 the Academy having received the favorable report of the Council on the proposed new code of By-Laws, the following resolution, prepared by the Solicitor and recommended by the Council, was adopted:

WHEREAS, the accompanying draft of the proposed new By-Laws of the Academy of Natural Sciences of Philadelphia, prepared by a Committee duly appointed, was presented and read at an

adjourned stated meeting of the Academy, held on September 23, 1924, and was then referred to the Council in accordance with the provision of the existing By-Laws, and

WHEREAS, the Council thereupon duly approved of the same and directed the said draft to be referred back to the Academy with a recommendation that the proposed new By-Laws be adopted

It is therefore resolved, that the said amended By-Laws as presented at this meeting be approved and adopted and that they become the regular By-Laws of The Academy of Natural Sciences of Philadelphia, thereby replacing the former By-Laws now in effect, provided that Section 3 of Article I of the new By-Laws, to wit, that "the building of the Academy shall be used for the exclusive purposes of the institution," shall become operative only when Article IV of Chapter I of the present By-Laws has been duly repealed.

As the By-Laws then adopted provided for a change in the time of closing the fiscal year, and of the holding of elections for officers, the following clarifying resolution was adopted:

Resolved, that the persons holding any offices or committee appointments under the Academy be requested and authorized to continue in the performance of their duties as such officers until such time as new officers are elected and duly qualified at the annual meeting as provided for in the above mentioned new By-Laws.

On November 18, with one hundred and fifteen members voting, the Academy struck out Article IV, Chapter I of the old By-Laws, and made the new code, adopted October 14, 1924, completely operative. Thus within a period of eight months, most of which time was required to comply with provisions of the old By-Laws for their amending, broad and constructive changes in the organization and operation of the Academy were approved. While the history and tradition of the Academy hold a very prominent place in the life of the institution, the necessity for certain changes enabling it to function more directly, more thoroughly and forcefully in the advancement of knowledge of the natural sciences has been evident for some years. Our organization now may adapt its policy more broadly to the work before it and utilize to the full the support and efforts of its members and workers.

An edition of the Charter, as amended, and the By-Laws as now operative, was printed in December, 1924 and distributed to the members of the Academy.

During the period covered by this report (i.e. December 1, 1923

to December 31, 1924) eleven stated meetings and adjourned meetings of the same have been held. These were on December 18, 1923, January 15, February 19, March 18, April 15, May 20, June 10, September 23, October 14, November 18 and December 16, 1924. The attendance of members at these ranged from fifteen to one hundred and twenty-three, the average being slightly over thirty-three. These figures include the very large attendance of one hundred and twenty-three at the meeting of November 18, 1924, when the presence of eighty members was required for action in connection with the amending of Chapter I, Article IV of the old By-Laws. On account of the exceptional character of the attendance at that meeting, it would seem best to ignore it in computing an annual average, which would give twenty-four as the figure, an increase in member attendance of five over that of 1923.

A special meeting was called by the President on February 6, 1924, at which Mr. Samuel G. Gordon made a communication on the work of the Second Vaux-Academy Expedition in Greenland during 1923. Twelve members and eighty-nine visitors were present at this meeting.

During the year twenty-four members have died and seven have resigned. The losses by death, known to the Recording Secretary, were as follows: Dr. David MacFarland Castle, C. Howard Colket, Theodore W. Cramp, Richard H. Day, I. Norris DeHaven, Frank T. Griswold, Mrs. H. M. Howe, Edward Hine Johnson, Theodore Justice, Sidney W. Keith, Dr. Henry Kraemer, Dr. Ernest La Place, Dr. Robert Grier LeConte, Miss Caroline Lippincott, Dr. David Greg Metheny, William H. Morris, Dr. George A. Piersol, George Colesberry Purves, Mrs. Evan Randolph, Frederick H. Shelton, John Thompson Spencer, Mrs. George C. Thomas, Henry S. Williams, Miss Juliana Wood. Of these the death of Dr. Robert G. LeConte, long a member of the Council and an earnest worker for the good of the institution, was a particularly notable loss to the Academy.

The following individuals were elected members:

Sustaining Member, Morris M. Green.

Life and *Annual Members:* A. C. Albrecht, Miss Laura Allen, Miss Elizabeth Apel, Dr. J. Harold Austin, Joseph Baird, Mrs. H. H. Barton, Jr., Dr. Bernard Berens, August Bein, Alfred A.

Biddle, Dr. Arthur E. Billings, Miss Julia H. Binney, John S. Bioren, Dr. David R. Bowen, Wendell Phillips Bowman, Dr. Thomas F. Branson, Franklin N. Brewer, Frederick W. Brill, Joseph H. Bromley, Jr., Coleman P. Brown, Miers Busch, Charles S. Calwell, Mrs. Mason Campbell, Mrs. D. H. Cantrell, Dr. E. Eleanor Carothers, James M. Castle, Dr. Henry M. Chance, Arthur L. Church, Mrs. E. Walter Clark, Joseph Horner Coates, Charles J. Cohen, B. Dawson Coleman, Mrs. Philip S. Collins, Mrs. S. W. Colton, Jr., Charles T. Cowperthwait, Mrs. Theron I. Crane, Theodore B. Culver, Wilfred H. Cunningham, Dr. Judson Daland, John T. Emlen, Howard C. Engle, Dr. William Evans, S. S. Eveland, John G. Fleck, Benjamin W. Fleisher, W. L. Fox, W. W. Frazier, 3rd, Dr. Leonard D. Frescoln, Mrs. C. Lincoln Furbush, Robert J. Gailey, Mrs. P. C. Garrett, Harrold Edgar Gillingham, E. Urner Goodman, Miss Emma Graf, Patrick Grant, 2nd, Albert M. Greenfield, Mrs. Thomas H. Griest, James S. Hatfield, Florence J. Heppe, Dr. Cheesman A. Herrick, Mrs. Albert G. Hetherington, Mrs. Charles S. Hinchman, Dr. T. B. Holloway, Dr. Arthur Hopewell-Smith, Mrs. Walter Horstmann, Edgar B. Howard, S. Pemberton Hutchinson, Charles E. Ingersoll, Dr. Earle H. Ingram, Walter M. Jeffords, Dr. Ralph L. Johnson, James Collins Jones, Edwin F. Keen, Sidney W. Keith, Arthur P. Kelley, Dr. Howard A. Kelly, L. H. Kinnard, Dr. Bernard Kohn, Dr. Frederick Krauss, Miss Anne Irwin Laughlin, Edward Lindsey, Howard A. Loeb, John H. McClatchy, Mrs. Samuel McCreery, C. Emory McMichael, George MacReynolds, James F. Magee, Jr., J. G. Malone, Alfred C. Mason, Edward F. Mason, William G. Mayburry, Mrs. W. R. Mercer, Dr. John V. Mershon, Dr. T. Grier Miller, Randal Morgan, Mrs. Edward Morrell, Mrs. Harrison S. Morris, Frank H. Moss, Clarence Leigh Moyer, Richard T. Nalle, David M. Newbold, Jr., Eugene S. Newbold, Theodore E. Nickles, Alfred J. Ostheimer, Dr. Maurice Ostheimer, C. S. W. Packard, Dr. Henry K. Pancoast, Morris L. Parrish, William H. Patterson, Dr. John R. Paul, Spencer Penrose, Mrs. Walter W. Pharo, George Brinton Phillips, H. A. Poth, Mrs. William P. Potter, Dr. Charles S. Potts, Mrs. Samuel Rea, Mrs. William B. Read, Mr. J. Howard Reber, Mrs. Charles J. Rhoads, William E. Rhoads, Dr. Russell Richardson, Howard S. Roberts, Dr. Randle C. Rosenberger, A. G.

Rosengarten, Frederic Rosengarten, Lessing J. Rosenwald, Mrs. Richard Rossmassler, Conrad A. Schirmer, William C. Schoettle, Mrs. Matthew Semple, Mrs. Salome R. F. Shallcross, F. H. Shelton, Norman Sherwood, Mrs. Samuel R. Shipley, Benjamin H. Shoemaker, 2nd, Miss Florence Sibley, George J. Siedler, Mrs. Wharton Sinkler, A. D. W. Smith, Henry B. Smith, John W. Sparks, John Thompson Spencer, Dr. Alfred Stengel, Antonio Y. Stewart, Henry W. Stokes, Mrs. George Strawbridge, Bradshaw H. Swales, John C. Taylor, Mrs. Roland L. Taylor, Benjamin Chew Tilghman, Dr. B. A. Thomas, Dr. Frank Wister Thomas, Miss Anne Thomson, Miss F. Arline Tryon, William M. Van Leer, Dr. Arno Viehoever, Mrs. Mary S. Verlenden, Henry Lorenz Viereck, Dr. William S. Wadsworth, William G. Warden, Walter Warner, Dr. S. Dana Weeder, Herbert S. Welsh, Mrs. J. William White, F. H. Wigton, James M. Willcox, Ira Jewell Williams, Parker S. Williams, Miss Mildred W. Wilson, Dr. Henry Winsor, Dr. James W. Wister, Owen Wister, B. H. Wood, Miss Juliana Wood, Mrs. Charles Stewart Wurts, Pope Yeatman, John E. Zimmermann.

Junior Members: Miss Anne Cadwalader, William Furness Jenks, D. Pratt Mannix, 3rd, Caroline Scattergood, Henry Scattergood, Roger Scattergood.

Associate Members: Dr. Afranio do Amaral, Dr. Davenport Hooker, William Procter.

In appreciation of their gifts to the Academy for special purposes, by action of the Council, Dr. Joseph Leidy, II, and Charles S. Hebard, were designated Sustaining Members.

By the adoption of the new code of By-Laws, which contains no provision for sections of the Academy, the Biological and Microscopical Section, the Entomological Section, the Mineralogical and Geological Section and the Ornithological Section automatically passed out of existence. To continue the work of the Biological and Microscopical Section the Leidy Microscopical Club has been formed, having the same independent status as the other scientific organizations to which the Academy acts as host; the activities of the Entomological Section have been assumed by the American Entomological Society, the active membership of the two having been the same; the Philadelphia Mineralogical Club fills the place of the Mineralogical and Geological Section, while the Delaware

Valley Ornithological Club very capably replaces the Ornithological Section in fostering ornithological activities and encouraging bird study. With their meetings held at the Academy and memberships largely composed of members of the Academy, these organizations by their special appeal to the younger student, the potential future worker, meet the insistent present day demand for specialization, voiced by the beginner and amateur as well as the mature investigator. Their value to the Academy in supplying desirable members is also a most important one.

During the year Dr. Joseph Leidy, II, presented to the Academy the dies of the Joseph Leidy Memorial Medal, the creation of which as a trust with the Academy was announced at the Joseph Leidy Memorial Meeting of December 6, 1923, as well as a fund of one thousand dollars for the award of the medal and an honorarium every three years, as stated in the report of the Recording Secretary for 1923. Dr. Leidy has informed the Academy of his desire to supply at once the medal and honorarium for the first award, so that it will not be necessary to await the accumulation of the income of the endowment fund.

The President of the Academy, with the approval of the Council and of the Academy, has appointed the following committee on the first award of the Joseph Leidy Memorial Medal: Dr. Witmer Stone (Chairman), Dr. Henry Skinner, Dr. Henry A. Pilsbry, James A. G. Rehn and Henry W. Fowler.

During the year the President, Dr. R. A. F. Penrose, Jr., presented to the Academy a most commodious and modern safe for the protection of records, important papers, the corporate seal, etc., as well as a number of beautiful rugs and pictures for the Central Office and that of the Recording Secretary. In addition he supplied rugs and furnishings for the Office of the President. The Council of the Academy has placed upon record its appreciation of these most welcome gifts.

The Central Office has continued to function most satisfactorily and it gives pleasure to be able to acknowledge the cordial coöperation and deep interest of the office staff in their work, as well as that of the whole institution.

JAMES A. G. REHN,
Recording Secretary.

Report of the Corresponding Secretary

With this meeting the duties of the Corresponding Secretary as an elective officer of the Academy cease and for that reason this report is brought down to even date. Hereafter all correspondence will be conducted and filed by the office or department of the Academy directly concerned, thus effecting a saving of time and avoiding conflicts of jurisdiction and responsibility. For many years, as a matter of fact, no attempt has been made to carry out the provisions of the By-Laws, which have been recognized generally as obsolete and quite unfitted to existing conditions at the Academy. The simplest correction seemed to be the abolition of the office and this the new By-Laws effect.

Correspondents were elected as follows: Edward A. Birge, Waldemar C. Brögger, Whitman Cross, Adolf Engler, Robert A. Harper, Ross G. Harrison, Ernst J. O. Hartert, Karl Jordan, Auguste Lameere, Henri A. Menegaux, William Patten, Anton Reichenow, Benjamin L. Robinson and Bror Yngve Sjöstedt.

The following correspondents died: Ludwig von Graff, Jacques Loeb, Charles W. Andrews, J. J. Stevenson, Sir Archibald Geike, John Beard, and Burt G. Wilder.

Invitations have been received to participate in the following: the Cincinnati meeting of The American Association for the Advancement of Science, Dr. H. S. Colton and Dr. D. H. Wenrich serving as delegates, the International Geographical Congress, to be held at Cairo in 1925, the joint celebration of the centenary of the founding of the Linnaean Society of Normandy and the Antiquarian Society of Normandy, the centenary celebration of the Franklin Institute, to which Dr. Edgar F. Smith was appointed a delegate, the meeting at Toronto of the British Association for the Advancement of Science, to which the President, Dr. Penrose, Dr. John Mason Clarke and Professor J. Playfair McMurrich were appointed delegates, the International Mathematical Congress, to which also Dr. Penrose and Dr. Clarke were the representatives of the Academy, the seventy-five year jubilee of the Natural Science Society in Hermannstadt, the Prague meeting of the International Institute of Anthropology, the one-hundredth anniversary of the

founding of Rensselaer Polytechnic Institute, the centennial jubilee of the founding of the Physical Society of Frankfurt a/M., the Third Pan-American Scientific Congress at Lima, Peru, at which Dr. Francis W. Pennell represented the Academy, the celebration of the fiftieth anniversary of the founding of the Adriatic Society of Natural Sciences, and the Washington meeting of The American Association for the Advancement of Science, to which Professor Philip P. Calvert and Dr. Henry A. Pilsbry were appointed delegates.

Following the usual custom congratulatory letters were sent whenever the Academy was unable to appoint delegates, and a number of appreciative responses were received among which is a medal struck in commemoration of the Twentieth International Congress of Americanists.

A number of letters in acknowledgment of various courtesies on the part of the Academy were received, notably one from the Imperial Librarian of Japan acknowledging the receipt of a complete set of the Academy's PROCEEDINGS and JOURNAL to replace that destroyed by the earthquake.

Routine correspondence, the statistics of which follow, was conducted as usual.

Communications received:

Acknowledging the receipt of the Academy's publications	154
Transmitting publications to the Academy	63
Requesting exchanges or the supply of deficiencies	8
Photographs and biographies of correspondents	11
Invitations to congresses, celebrations of scientific institutions, etc.	19
Notices of deaths of scientific men	6
Circulars concerning the administration of scientific and educational institutions, etc.	14
Letters from correspondents and miscellaneous letters	122
Total received	397

Communications forwarded:

Acknowledging gifts to the library	565
Requesting the supply of deficiencies	245
Acknowledging gifts to the museum	134
Acknowledging photographs and biographies of correspondents	10
Letters of sympathy or congratulation, addresses, etc.	14
Diplomas and notices of election of correspondents', and delegates' credentials	26
Miscellaneous letters	148
Annual reports sent to correspondents	178
Total forwarded	1320

J. PERCY MOORE,
Corresponding Secretary.

Report of the Treasurer

SUMMARY OF THE ACCOUNTS OF GEORGE VAUX, JR., TREASURER OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, FOR THE FISCAL PERIOD ENDED DECEMBER 31ST, 1924.

GENERAL FUND

RECEIPTS

Balance on hand 30th November, 1923	$ 5,175.55	
Income from Investments	46,255.64	
Income from the Estate of John Turner	160.97	
Annual Dues	5,434.00	
Interest on Bank Balance	406.50	
Publications sold	743.83	
Subscribed Contributions for Joseph Leidy Commemorative Committee	400.00	
Balance from Salary Account	239.88	
Miscellaneous Refunds and Receipts	1,037.75	$59,854.12
Transfers from Special Funds:		
For Curatorial Expenses		
Mary R. D. Smith Fund	$ 70.00	
Conchological Section Fund	1,600.00	
Horace N. Potts Fund	325.00	
Aubrey H. Smith Fund	750.00	
J. F. Beecher Memorial Laboratory Fund	1,950.00	
For Other Purposes		
Mary Jeanes Museum Fund	775.00	
Thomas B. Wilson Fund	400.00	
Special Donations Fund	286.33	
General Endowment Fund	190.00	6,346.33
		$66,200.45

PAYMENTS

Curator's Department		
Salaries	$34,160.32	
Museum Cases	840.75	
Specimens and Expeditions	648.57	$35,649.64
Librarian's Department		
Salaries	2,466.66	
Office Expenses	47.82	
Purchase of Books	1,676.18	
Binding of Books	1,324.75	5,515.41
Publications		
Printing Proceedings	2,578.25	
Printing Yearbooks	1,200.53	
Office Expenses—Publication Committee	172.60	
Salaries—Publication Committee	1,950.00	5,901.38

General		
General Expenses including fuel, light, water and building repairs	5,784.53	
Recording Secretary's salary and expenses	829.95	
Corresponding Secretary's Expenses	26.68	
Treasurer's Department Expenses	199.69	
Central Office Expenses	894.50	
Central Office Salaries	4,499.92	
Mary S. Warren on account of 1309 Arch Street	1,800.00	
Membership Campaign	608.18	
Joseph Leidy Commemorative Committee	405.00	15,048.45
		62,114.88
Balance December 31, 1924		4,085.57
		$66,200.45

CONCHOLOGICAL SECTION FUND

RECEIPTS

Net Income from Investments	$ 1,267.19
Balance December 31, 1924—Overdrawn	736.36
	$ 2,003.55

PAYMENTS

Balance November 30, 1923—Overdrawn	$ 403.55
Transferred to General Fund for Curatorial Expenses	1,600.00
	$ 2,003.55

COPE COLLECTION FUND

RECEIPTS

Balance November 30, 1923	$ 836.27
Net Income from Investments	1,019.58
Balance December 31, 1924	$ 1,855.85

F. V. HAYDEN MEMORIAL FUND

RECEIPTS

Net Income from Investments	$ 102.16

PAYMENTS

Balance November 30, 1923—Overdrawn	$ 29.43
Balance December 31, 1924	72.73
	$ 102.16

HORACE N. POTTS FUND

RECEIPTS

Balance November 30, 1923	$ 54.66
Net Income from Investments	275.38
Balance December 31, 1924—Overdrawn	57.46
	$ 387.50

PAYMENTS

Transferred to General Fund for Curatorial Expenses	$ 387 50

MARY JEANES MUSEUM FUND

RECEIPTS

Net Income from Investments	$ 870.70

PAYMENTS

Balance November 30, 1923—Overdrawn	$ 42.13
Transferred to General Fund for Museum Expenses	775.00
Balance December 31, 1924	53.57
	$ 870.70

JESSUP FUND—MALE BRANCH

RECEIPTS

Balance November 30, 1923	$ 34.40
Net Income from Investment	613.76
Balance December 31, 1924—Overdrawn	26.84
	$ 675.00

PAYMENTS

Salaries to Students	$ 675.00

JESSUP FUND—FEMALE BRANCH

RECEIPTS

Balance November 30, 1923	$ 48.04
Net Income from Investments	222.78
	$ 270.82

PAYMENTS

Salaries to Students	$ 250.00
Balance December 31, 1924	20.82
	$ 270.82

J. A. MEIGS LIBRARY FUND

RECEIPTS

Balance November 30, 1923	$ 45.13
Net Income from Investments	556.20
Balance December 31, 1924–Overdrawn	48.67
	$ 650.00

PAYMENTS

Books Purchased	$ 650.00

J. H. REDFIELD MEMORIAL FUND

RECEIPTS

Balance November 30, 1923	$ 459.19
Net Income from Investments	175.95
	$ 635.14

PAYMENTS

Plants Purchased	$ 436.21
Balance December 31, 1924	198.93
	$ 635.14

MARY REBECCA DARBY SMITH FUND

RECEIPTS

Balance November 30, 1923	$ 2.45
Net Income from Investments	71.46
	$ 73.91

PAYMENTS

Transferred to General Fund for Curatorial Expenses	$ 70.00
Balance December 31, 1924	3.91
	$ 73.91

AUBREY H. SMITH FUND

RECEIPTS

Net Income from Investments	$ 735.44
Balance December 31, 1924—Overdrawn	62.52
	$ 797.96

PAYMENTS

Balance November 30, 1923—Overdrawn	$ 47.96
Transferred to General Fund for Curatorial Expenses	750.00
	$ 797.96

FRANCES LEA CHAMBERLAIN FUND

Balance November 30, 1923	$ 812.72
Net Income from Investments	235.61
Balance December 31, 1924	$ 1,048.33

THOMAS B. WILSON FUND

RECEIPTS

Balance November 30, 1923	$ 2.58
Net Income from Investment	489.77
	$ 492.35

PAYMENTS

Books Purchased	$ 90.00
Transferred to General Fund for Librarian's Salary	400.00
Balance December 31, 1924	2.35
	$ 492.35

WILLIAM S. VAUX FUND

RECEIPTS

Balance November 30, 1923	$ 95.17
Net Income from Investments	511.82
Duplicate minerals sold	132.27
	$ 739.26

PAYMENTS

Minerals Purchased	$ 620.41
Balance December 31, 1924	118.85
	$ 739.26

I. V. WILLIAMSON FUND

RECEIPTS

Balance November 30, 1923	$ 255.25
Net Income from Investments	1,926.45
	$ 2,181.70

PAYMENTS

Books Purchased	$ 1,861.35
Transferred to Principal for Investment	255.25
Balance December 31, 1924	65.10
	$ 2,181.70

J. F. BEECHER MEMORIAL LABORATORY FUND

RECEIPTS

Balance November 30, 1923	$ 981.66
Net Income from Investments	1,132.67
	$ 2,114.33

PAYMENTS

Transferred to General Fund for Curatorial Expenses	$ 1,950.00
Balance December 31, 1924	164.33
	$ 2,114.33

GENERAL ENDOWMENT FUND

RECEIPTS

Balance	$ 12.44
Net Income from Investments	179.56
	$ 192.00

PAYMENTS

Transferred to General Fund	$ 190.00
Balance December 31, 1924	2.00
	$ 192.00

ELEANOR T. LONG FUND

RECEIPTS

For Collection of Geological Specimens and Publication of Report	$ 1,000.00
Balance December 31, 1924	$ 1,000.00

JOSEPH LEIDY MEMORIAL FUND

Net Income from Investment	$ 50.16
Balance December 31, 1924	$ 50.16

SPECIAL DONATIONS FUND

GENERAL PURPOSES

RECEIPTS

Balance on hand November 30, 1923	$ 286.33
Thomas Robins	5.00
Miss Hannah Fox	20.00
	$ 311.33

PAYMENTS

Transferred to General Fund	$ 286.33
Balance on hand December 31, 1924	25.00
	$ 311.33

CONTRIBUTIONS FOR ARCHEOLOGICAL CASES

RECEIPTS

Balance on hand November 30, 1923	$ 874.00
A Friend	350.00
	$ 1,224.00

PAYMENTS

Disbursed	$ 1215.00
Balance December 31, 1924	9.00
	$ 1,224.00

CONTRIBUTIONS FOR PURCHASE OF BIRDS

RECEIPTS

Balance on hand November 30, 1923	$ 200.00

PAYMENTS

Disbursed	$ 110.00
Balance December 31, 1924	90.00
	$ 200.00

CONTRIBUTIONS FOR 1924 ORTHOPTERA FIELD FUND

RECEIPTS

Charles S. Hebard	$ 1,200.00
Morgan Hebard	800.00
	$ 2,000.00

PAYMENTS

Disbursed	$ 2,000.00

JOSEPH LEIDY COMMEMORATION MEETING PUBLICATION FUND

RECEIPTS

Francix X. Dercum	$ 50.00
Joseph Leidy	100.00
R. A. F. Penrose, Jr.	400.00
	$ 550.00

PAYMENTS

Disbursed	$ 531.11
Balance on hand December 31, 1924	18.89
	$ 550.00

CONTRIBUTIONS FOR VERTEBRATE ZOOLOGY—1924

RECEIPTS

Childs Frick	$ 250.00
George L. Harrison	250.00
C. B. Penrose	50.00
William L. Abbott	50.00
R. A. F. Penrose, Jr.	100.00
	$ 700.00

PAYMENTS

Disbursed	$ 400.00
Balance on hand December 31, 1924	$ 300.00
	$ 700.00

ZOOLOGICAL RECORD FUND

RECEIPTS

George L. Harrison	$ 15.00
Philip P. Calvert	50.00
Morgan Hebard	25.00
R. A. F. Penrose, Jr.	25.00
J. Percy Moore	10.00
Henry Skinner	10.00
R. C. Williams	10.00
	$ 145.00

PAYMENTS

Disbursed	$ 145.00

CONTRIBUTION FOR UNION LIST OF SERIALS

R. A. F. Penrose, Jr.	$ 200.00
Balance on hand December 31, 1924	$ 200.00

CONTRIBUTIONS FOR 1924 BOTANICAL EXPEDITION

RECEIPTS

R. A. F. Penrose, Jr.	$ 100.00
T. Chalkley Palmer	$ 100.00
	$ 200.00

PAYMENTS

Disbursed	$ 200.00
	$ 200.00

CONTRIBUTIONS FOR BUILDING MAINTENANCE

RECEIPTS

R. A. F. Penrose, Jr.	$ 3,600.00
	$ 3,600.00

PAYMENTS

Disbursed	$ 2,710.00
Balance on hand December 31, 1924	890.00
	$ 3,600.00

CONTRIBUTIONS FOR CRYSTALLOGRAPHIC TABLES

RECEIPTS

Frank J. Keeley	$ 25.00
George Vaux, Jr.	25.00
Balance on hand December 31, 1924	$ 50.00

CONTRIBUTIONS FOR ENTOMOLOGICAL PREPARATION

RECEIPTS

Morgan Hebard	$ 30.00
	$ 30.00

PAYMENTS

Disbursed	$ 30.00
	$ 30.00

Respectfully submitted,

Correct—

DOROTHY F. PALMER,
Bursar.

GEORGE VAUX, JR.,
Treasurer.

E. and O. E.
Philadelphia,
January 2, 1925.

As the result of an audit made by us of the books and accounts of The Academy of Natural Sciences of Philadelphia, we hereby certify that the above statement is in accord therewith and in our opinion correctly reflects the results of the financial activities during the period indicated.

(Signed) EDWARD P. MOXEY & CO.,
Certified Public Accountants.

Philadelphia, Pa.,
January 22, 1925.

REPORT OF THE TREASURER OF THE MANUAL OF CONCHOLOGY

The Treasurer of the "Manual of Conchology" respectfully reports

Receipts from all sources, for the year ending November 30, 1924	$ 1,160.82
And disbursements	372.12
Balance	788.70
Which added to balance Nov. 30, 1923	2,206.18
Leaves total cash on hand	$ 2,994.88

The receipts were as follows:

From Subscriptions, Vol. XXVI	$ 20.10
" " Vol. XXVII	313.80
" Sale of earlier Volumes	777.95
" Interest on Daily Bank Balances	48.97
	$ 1,160.82

The disbursements were:

For Lithographing and Engraving	$ 146.07
" Paper and Printing	158.32
" Binding	18.50
" Postage, Advertising, etc.	49.23
	$ 372.12

Respectfully submitted,
S. RAYMOND ROBERTS,
Treasurer.

February 3, 1925.
Examined and found correct.
R. C. WILLIAMS, JR.,
Chairman, Committee on Accounts.

Report of the Curators

The exhibition halls of the Museum have been open to the public as heretofore throughout the year and the attendance has been large, especially on Sundays and on days when lectures were being delivered.

The Bald Eagle's nest secured for the Museum several years ago by Mr. Arthur H. Fisher has been mounted and placed on permanent exhibition with a group of old and young birds presented by Mr. Wharton Huber.

Many additions were made to the collection of casts of local reptiles and batrachians and the Ludwick Institute has provided three exhibition cases for their better display. These casts have all been colored by Mr. Harold T. Green who, besides managing the Ludwick Institute lecture courses, has superintended the Museum exhibits and prepared several other exhibits, notably a synoptical collection of insects illustrating the principal orders. The local collection of mammals has also been rearranged and relabelled and placed on exhibition in a special case in the mammal hall.

The usual seasonal exhibition of local birds was maintained during the spring.

Through the generosity of Dr. R. A. F. Penrose, Jr., it was possible to make important and necessary repairs to the building. All of the outside woodwork was painted and the smoke stack repointed, while corrugated glass has been substituted for the clear panes throughout the main Museum halls, giving better diffusion of light, and protecting the specimens from the direct rays of the sun. New window shades were also provided for the Library and the lower Museum floor, and the old Museum in the north wing which has been closed for several years was thoroughly cleaned and the collections stored there rearranged. Much local field work in the various departments has been carried on and valuable additions to the collections secured.

Several more extended trips have also been undertaken.

Mr. James A. G. Rehn and Mr. Morgan Hebard, through the support of the latter and Mr. Charles S. Hebard, continued their field studies of the Orthoptera of portions of the western United

States, examining the basins and basin ranges of central Nevada and the central and western portions of the Mexican border country of Arizona. These investigations supplemented and elaborated similar field work of the years 1907, 1909, 1910, 1919, and 1922, in surrounding territory, or in limited areas of the regions more intensively studied the past season. The 1924 expedition has been named the Nevada-Arizona Expedition of 1924.

Mr. Wharton Huber, through the courtesy of Mr. Charles M. B. Cadwalader, was enabled to spend a week with him collecting ducks on Currituck Sound, N. C., and a most valuable and interesting series of specimens was secured which have been carefully prepared by Mr. Huber.

MAMMALS

Many valuable specimens of mammals have been received during the year from the Zoological Society of Philadelphia which have been prepared as skins, skulls or skeletons. Notable among these was a Hardwick's Hemigale, a young African Elephant and a young Hippopotamus. Mr. Rodolphe Meyer de Schauensee also secured several interesting specimens on his expedition to the Amazon which he generously presented.

The series of American squirrels was loaned to the U. S. Biological Survey for the use of Mr. Arthur H. Howell in his study of this group and the shrews for the use of Dr. H. H. T. Jackson, the material benefitting by their revised identifications. Mr. Morris M. Green also studied the collection and rearranged portions of it during the year.

BIRDS

The routine work of the department and care of the collections have occupied most of Mr. Huber's time during the year, but he has been able to complete the identification of his Nicaraguan collection. Most of Dr. Stone's time has been taken up with executive duties of the Museum, so that but little research work has been possible.

Many valuable additions have been made to the collections during the year. Through the generous support of Mr. Childs Frick a collector has been maintained in the Kiang Ku region, China, who

has this year devoted his attention to birds and has secured an interesting series. Several members of the Academy also subscribed funds for the purchase of a collection of birds procured by Mr. Alfred Loveredge in Tanjanyka Territory, Africa and other smaller collections were obtained from Mr. José Steinbach from Bolivia and Mr. Thomas S. Gillen from southern Mexico.

Mr. Alfred C. Redfield presented a small series of local birds, and from the estate of Isaac Norris DeHaven the Academy received his entire collection of birds from Pennsylvania, New Jersey and Virginia.

During the spring Dr. Stone completed the report on the birds of the Princeton Patagonian Expedition receiving in return a valuable series of specimens for the Academy.

The types of fossil birds in the Academy collections were loaned to the U. S. National Museum and casts made from all of them, several sets of duplicates being presented to the Academy for exchange with other institutions.

The Delaware Valley Ornithological Club has held its meetings regularly in the ornithological rooms and has done much to stimulate study of the local birds.

Prince Takazukasi, Dr. Jonathan Dwight, Ludlow Griscom, Dr. James P. Chapin, W. E. Clyde Todd and other visiting ornithologists have studied the collections during the year and specimens have been loaned to W. E. C. Todd, F. H. Kennard, Frank M. Chapman, E. L. Poole, and Outram Bangs.

REPTILES AND AMPHIBIANS

The collection of reptiles and amphibians has continued in the charge of Mr. Henry W. Fowler, but apart from some local accessions but little addition has been made to it, and no research work has been done in this department.

Mr. E. R. Dunn and Dr. Thomas Barbour have studied material in the collection and specimens have been loaned to the latter.

FISHES

Mr. Henry W. Fowler has cared for the collection of fishes and has been instrumental in securing much valuable material in return

for studying and identifying collections submitted by other institutions.

The report on the fishes obtained by the Tanager Expedition of 1923 in coöperation with the Bishop Museum of Honolulu has been completed and a preliminary account has already appeared in the PROCEEDINGS of the Academy by Henry W. Fowler and Stanley C. Ball. The final report will embrace all the collections from Lysan, Necker, French Frigate, Bird Island, etc., besides Johnston and Wake Islands. In addition to the few new species many rare and interesting forms are described. Noteworthy in the preliminary paper mentioned above is the discovery of an interesting new percoid allied to the kyphosids, constituting a new species, a new genus and a new family. It is dedicated to Dr. Herbert E. Gregory, the Director of the Bishop Museum.

A second report, dealing with the collection made by Lieut. Hans G. Hornbostel at the Island of Guam, has been completed. In this connection the large collections from Hawaii sent to the Academy in 1923, besides a few subsequent ones, have been identified.

A third lot of material contains the collections of the Whippoorwill Expedition made in the summer of 1924 at Jarvis, Christmas, Fanning, Washington, Palmyra, Baker and Groveland Islands. These will be studied during the coming year.

A preliminary paper, embracing an examination of many Chinese fresh-water fishes has been published by the American Museum of Natural History in New York. This forms part of the ichthyological studies of the extensive collections made by their Third Asiatic Expedition.

The Marine Fishes of West Africa, an extensive manuscript has been prepared and delivered to the American Museum to be used as part of their Congo reports.

The Indian cyprinoids, over 3000 specimens, loaned by the Museum of Comparative Zoölogy in 1917, have been reported upon, in an illustrated paper in the PROCEEDINGS of the Academy, and a full series of specimens thereby obtained.

Other papers have appeared on collections, either sent to the Academy as gifts or for study, in the Memoirs of the Asiatic Society of Bengal, the Annals of the Natal Government Museum and the Journal of the Bombay Society of Natural History.

A descriptive illustrated paper is now in press on the North American cyprinoids not previously studied, in the Academy collections.

Many local collecting trips were made through the summer and small collections obtained, mainly in the eastern half of Pennsylvania.

INSECTS

Dr. Skinner, Special Curator of Insects reports as follows: As usual, the insect collection has been greatly increased by purchase, gift, and from expeditions.

Mr. Cresson is continuing his studies in the dipterous families Ephydridae and Micropezidae, and has determined specimens of these and other families for the U. S. National Museum, Boston Society of Natural History, Vienna National Museum, Canadian Dept. of Agriculture, Mr. C. F. Adams, and others. He reports handling over 1350 specimens representing 166 species of which the Academy received over 275 specimens and 105 species, including 23 species new to the collection.

The coleopterous family Tenebrionidae, containing over 525 species and 4625 specimens; and the hymenopterous genus *Xylocopa*, containing 29 species and 400 specimens, have been incorporated in new glass top boxes.

With the aid of E. T. Cresson, Sr., the entire undetermined and duplicate material of the order Hymenoptera, has been gone over and placed in tight boxes with napthalene, thus preserving this vast and valuable collection.

A collection of Brazilian Hymenoptera, mostly of the family Apidae, amounting to over 700 specimens, has been received from the G. B. Cresson (Estate), and has been removed to safe boxes and fumigated.

A large collection of Coleoptera, from the Western States, was presented by Mrs. F. S. Daggett. Mr. Morgan Hebard donated over a thousand moths, collected in Maine and in the West. Professor J. F. Tristan presented several hundred insects from Costa Rica. Mr. R. C. Williams, Jr. donated nearly four hundred moths and butterflies, from North and South America. Many of these have been mounted for the collection by Miss Caroline H. Lane and Miss Dorothy Tubb, aides in the department.

The Coleopterous family, Coccinellidae has been rearranged as well as a number of genera of the Neotropical Nymphalidae.

Mr. R. C. Williams, Jr. has rearranged the Nearctic Hesperidae and part of Neotropical material in this family of the Lepidoptera.

The Special Curator and Mr. Williams have completed their studies of the genitalia of the North American Hesperidae and published the last part, numbering in all 128 pages. The new boxes received during the year have greatly aided in the proper housing of the collections.

Mr. J. A. G. Rehn has completed his study of the Blattidae of the West Indies, having incorporated the information on this family secured by him in the Blue Mountains of Jamaica in 1923. Some progress has also been made by him on a number of reports on African Orthoptera, which have been in progress for some years. Small collections have been determined for other institutions or departments, such as the Department of Agriculture of Jamaica, and that of Porto Rico, as well as the Stockholm Museum, while the most important collection of Blattidae of the South African Museum has been received for study. He has published a study of the Dermaptera of the American Museum Congo Expedition, in the Bulletin of that Museum (XLIX, pp. 349–413).

Mr. Morgan Hebard, Research Associate, has continued his studies on the Orthoptera of Panama and Mexico, completed the examination of an extensive series of Ecuadorian Dermaptera and Orthoptera, critically studied the previously unworked European and Japanese Acrididae in our series and is engaged in preparing a catalogue of the Orthoptera of South Dakota. He has also continued the work of rearranging portions of the exotic series of Acrididae and Tettigoniidae, and negotiated further exchanges of Hebard Collection material with the British Museum of Natural History and also with the Geneva Museum.

Mr. Hebard has secured by purchase a large collection of Orthoptera from the Philippines, as well as various smaller but desirable series from different parts of the world. His publications during the year were as follows:

The Philippine Genus Misythus (Orthoptera, Acrididae, Acridinae). Proc. Acad. Nat. Sci. Phila., LXXV, pp. 323–357, pls. 20–24.

Studies in the Acrididae of Panama (Orthoptera). Trans. Amer. Entom. Soc., L, pp. 75–140, pls. VI–VIII.

The Group Scyllinae (Orthoptera, Acrididae, Acridinae) as Found in North America, with Records and Data on Its Occurrence in the United States. Trans. Amer. Entom. Soc., L. pp. 157–162, pl. IX.

Studies in Japanese Acrididae (Orthoptera). Trans. Amer. Entom. Soc., L, pp. 209–224.

Studies in the Dermaptera and Orthoptera of Ecuador. Proc. Acad. Nat. Sci. Phila., LXXVI, pp. 109–248, pls. V–X.

Partly through the support of Mr. Hebard an additional preparator was secured for the department during the month of December to mount specimens of Orthoptera and Dermaptera.

The Academy is greatly indebted to Mr. R. C. Williams, Jr., Research Associate, Dr. Philip P. Calvert, Mr. E. T. Cresson, and Mr. Frank R. Mason, for valuable assistance in the work of the Department.

Examination of specimens and comparison with typical material have been made for Prof. T. D. A. Cockerell, Mr. J. R. Malloch, Mr. J. C. Crawford, and Dr. E. C. VanDyke.

Specimens were loaned during the year to J. M. Bruer, J. A. Comstock, E. D. Ball, T. D. A. Cockerell, W. A. Hoffman, B. Uvarov, W. C. Coker, S. W. Bromely, C. E. Mickel, E. B. Williamson, H. L. Vierick, C. H. Curran, and E. C. Van Dyke.

MOLLUSKS

Dr. Henry A. Pilsbry, Special Curator of Mollusks, reports that ten papers were published by himself and five by Mr. E. G. Vanatta during the year upon mollusks of the United States, West Indies, South America and South Africa. Work and publication has been continued on the Monograph of the Pupillidae in the "Manual of Conchology."

Considerable time has also been occupied with the study of the fresh-water mollusks of the Belgian Congo and of Lake Champlain.

Eighty-eight lots of specimens have been determined for various persons and institutions and accessions have been received from eighty-two persons and institutions.

Specimens were loaned to Prof. G. D. Harris, and L. W. Stephenson.

PLANTS

Dr. Francis W. Pennell reports on the department under his care as follows:

During 1924 work has continued as usual in both the General and the Local Herbaria. In the mounting of specimens we are about keeping abreast of the incoming collections. Twenty additional cases for the housing of the General Herbarium have been installed which will enable us to expand most of the sympetalous orders.

The rearranging of the sheets in the General Herbarium for the purpose of facilitating rapid geographical reference has been continued through the voluntary assistance of certain members of the Academy. Dr. Henry Leffmann has completed the arrangement of the Asteraceae, and has also reviewed the Rubiaceae. With work done by Mr. John M. Fogg, Jr. two years ago and completed by the Curator of Plants, the Menthaceae are also in geographical sequence, and the Solanaceae are also in process of rearrangement.

During most of the year, Mr. Miles Vollmer has acted as aid in the General Herbarium, and in October, 1924, was succeeded by Mr. Joseph Adams. Miss Ada Allen continues her skillful work as mounter of the General Herbarium.

Little field-work was attempted by the Curator of Plants during 1924. In June an excursion was made to Washington, D. C., the Shenandoah Valley in Virginia, and Franklin County, Pennsylvania, in search of critical species of *Penstemon*. Large series of specimens of Scrophulariaceae borrowed from the Ohio State University, Kansas State Agricultural College, University of Nebraska, University of Kentucky, and the University of Tennessee, have been reviewed preparatory to a revision of the Scrophulariaceae of the Middle and North Central States. Manuscripts of Scrophulariaceae for two forthcoming volumes by Dr. John K. Small have been in part revised. Also studies have been made of the genera *Afzelia* and *Allophyton*, and the results made nearly ready for publication.

On December 11, 1924 the Curator of Plants sailed for Lima, Peru, in order to attend the Third Pan-American Scientific Congress, and after that to spend the months of January to March in Chile, and of April to June, 1925, in Peru. Especial attention

will be given to Scrophulariaceae, but collections of all Andean plants possible will be obtained. Besides the Academy, the following institutions are interested in the expedition and have aided by contributions of funds, Field Museum of Natural History, Harvard University, and the New York Botanical Garden, while Prof. Oakes Ames, of Harvard University, is interested in the orchids obtained.

The Local Herbarium continues under the efficient care of Mr. Bayard Long, who volunteers his services, with Mr. George W. Bassett as aid. It continues to receive the interest of members of the Philadelphia Botanical Club.

Specimens were loaned to the Gray Herbarium, Field Museum, U. S. National Herbarium, New York Botanical Garden, E. B. Payson, W. Trelease, J. M. Greenman, A. S. Hitchcock, E. A. Bessey, J. N. Rose, C. V. Piper and the University of California.

MINERALS AND ROCKS

During the past year, Mr. Samuel G. Gordon, Assistant Curator, has been engaged in the crystallographic and optical investigations of the minerals obtained on the Academy-Mineralogical Expeditions to the Andes in 1921, and to Greenland in 1923. Several papers descriptive of these minerals were published. Short trips were made in the summer to Franklin, and Moore, N. J.; West Quincy, Mass.; Branchville, Conn.; and to the French Creek and Cornwall mines in Pennsylvania.

Mr. Edward Goldsmith has presented a spectroscope, Dr. Thomas S. Stewart has deposited his X-ray apparatus, and Mrs. Harrison S. Morris a Herbert-Smith refractometer, for the use of the department.

Notable additions to the general collection were a specimen of malachite from Siberia, presented by Mrs. J. Bertram Lippincott and Mrs. Harrison S. Morris; and a large apophyllite from the French Creek Mines by Messrs. N. Hoster, and William Maddren. Mr. Frederick Hilbiber has, as in the past, presented zeolites from the working quarry at Perkiomenville, Penna.

Dr. R. A. F. Penrose, Jr., presented a large polished section of a pegmatite pipe in riebeckite-granite from West Quincy, Mass., which is now exhibited in the Mineral Hall.

The Philadelphia Mineralogical Society has held its meetings regularly at the Academy, and a number of students have consulted the collections.

ARCHEOLOGY

Miss H. Newell Wardle has continued in charge of the collections of this department.

During the year 1924 three hundred and thirty archeological and ethnographical specimens were added to the collections, many of them of special interest because of their great rarity.

Mr. Clarence B. Moore's continued interest in the Academy has enabled the Department of Archeology to arrange exchanges with other museums which have added series of rare specimens from the Channel Islands of the Pacific.

The important material in the Gottschall Collection, representing eighteen tribes of Algonkin, Iroquoian, Muscogean and Siouan stocks, has been catalogued and, in part, placed on exhibition.

The generous gift of two new wall cases has permitted the display of Algonkin (Cree and Chippewa) and Siouan material. The Assistant Curator in charge spent the summer at work upon the archeological collections from Pennsylvania and New Jersey, personally cleaning their thousands of specimens and transferring them from the old building, where they have been inaccessible for study, to convenient storage beneath the cases in the Archeological Hall.

Miss Wardle prepared and read a paper on "The Scope of the Rite of Adoption" before the American Anthropological Association at the Washington meeting.

WITMER STONE,
Executive Curator.

REPORT OF THE CURATOR OF THE WILLIAM S. VAUX COLLECTIONS.

Since previous report, over two hundred specimens have been added to the William S. Vaux Collections, including sixty-five species not hitherto represented.

The following specimens deserve special mention. Vanadinite from Morocco; enargite from Butte, Montana; epidote from Prince of Wales Island, Alaska; crystallized niccolite from Germany, a

suite of radioactive minerals from the Belgian Congo, and a suite of Scandinavian minerals new to the collection.

Gifts were received as follows:—Cassiterite, Irish Creek, Va.; inyoite, Hillsboro, N. B.; analcite, Pinnacle Island, N. S. from Mr. M. G. Biernbaum.

Gmelinite, Pinnacle Island, N. S. and fibrous quartz, Providence, R. I., from Mr. J. S. Frankenfield.

Stilbite, Moore, N. J., lithiophyllite, Branchville, Conn.; and various minerals from Franklin, N. J., from Mr. Samuel G. Gordon.

A suite of minerals from West Quincy, Mass. from Dr. Chas. Palache.

Camsellite, British Columbia, from Dr. Eugene Poitevin.

Apophyllite, French Creek Mines, from Mr. Geo. Vaux, Jr.

Descloisite, S. W. Africa, chloroxiphite, diaboleite, mendipite and hydrocerussite, Mendio Hills, rhabdophane, Cornwall, epidesmine, Schwartzenberg, Sax., rhodocrosite and axinite, Caylloma, Peru, and thirteen specimens from Alston district, Cumberland, from Dr. L. J. Spencer of the British Museum.

Respectfully submitted,

F. J. KEELEY,

Curator, William S. Vaux Collections.

LUDWICK DEPARTMENT OF PUBLIC INSTRUCTION

The usual courses of free public lectures have been given during the year as follows under the auspices of the Ludwick Institute:

MONDAY EVENING COURSE

January 7. "The Sources of the Athabaska." Benjamin W. Mitchell, Central High School, Philadelphia.

January 14. "Sea Birds and Shore Birds." Witmer Stone, Academy of Natural Sciences of Philadelphia.

January 21. "The Way of the Sperm Whaler." Robert Cushman Murphy, American Museum of Natural History, New York.

January 28. "Glimpses of Our National Parks." Henry W. Fowler, Academy of Natural Sciences of Philadelphia.

February 4. "A Safari to the Highlands of the Great Crator." James L. Clark, American Museum of Natural History, New York.

February 11. "The World of Insects." James A. G. Rehn, Academy of Natural Sciences of Philadelphia.

February 18. "A Month on the Wonder-land Trail." Floyd W. Schmoe, Park Naturalist, Mount Rainier National Park.

February 25. "The Great Barrier Reef of Australia." Henry A. Pilsbry, Academy of Natural Sciences of Philadelphia.

March 3. "Wild Animals Near Home." G. Clyde Fisher, American Museum of Natural History, New York.
March 10. "The Study of Wild Birds." Witmer Stone, Academy of Natural Sciences of Philadelphia.
March 17. "Australia and the Australians." Henry A. Pilsbry, Academy of Natural Sciences of Philadelphia.
March 24. "The Land of Contrasts. From New Mexican Plains to Colorado Rockies." James A. G. Rehn, Academy of Natural Sciences.
March 31. "Fossil Mammals." W. D. Matthew, American Museum of Natural History, New York.
April 7. "Lands of the Orient." Spencer Trotter, Swarthmore College.
April 14. "Life in a Tropical Collecting Station." Wharton Huber, Academy of Natural Sciences of Philadelphia.
April 21. "Four Months Under Hawaiian Skies." Henry W. Fowler, Academy of Natural Sciences of Philadelphia.

SUNDAY AFTERNOON COURSE.

February 3. "Mexico and Yucatan, To-day and Before Columbus." William E. Hughes, Academy of Natural Sciences.
February 10. "The Mountains and Icefields of the Central Canadian Rockies." J. Monroe Thorington.
February 17. "Wild Life of the Pacific Northwest." C. J. Albrecht, American Museum of Natural History, New York.
February 24. "Islands of the South Pacific." Henry A. Pilsbry, Academy of Natural Sciences of Philadelphia.
March 2. "The Home Life of Familiar Birds of the Philadelphia Region." Witmer Stone, Academy of Natural Sciences of Philadelphia.
March 9. "Peoples of the Western Pacific." Spencer Trotter, Swarthmore College.
March 16. "An Entomologist in Costa Rica." James A. G. Rehn, Academy of Natural Sciences of Philadelphia.
March 23. "In the Haunts of the Water Fowl and Waders." J. Fletcher Street, Delaware Valley Ornithological Club, Philadelphia.

There were also ten lectures given to children of the schools of Philadelphia and vicinity by members of the Academy's scientific staff as follows: two each by Witmer Stone on local plants and birds, two by James A. G. Rehn on local insects, two by Henry W. Fowler on fishes and fisheries of our rivers, and two by Henry A. Pilsbry on mollusks and the islands of the Pacific.

The attendance has materially increased nearly 6,000 persons attending the regular courses and 3,000 the special school lectures. Different schools were represented among the latter, while thirty city schools, and ten from nearby towns, visited the Museum in classes to study the exhibits.

The management of the lectures and the school visits has, as last year, been in charge of Mr. Harold T. Green.

ADDITIONS TO THE MUSEUM

1924

MAMMALS

M. C. BOOTH. White-footed Mouse (*Peromyscus leucopus*), Pennsylvania

DR. H. W. FREAS. One Red Bat (*Nycteris borealis*), Pennsylvania.

ELLIS S. JOSEPH. Gelada Baboon (*Theropithecus gelada*), Abyssinia.

NATHAN KITE. Short-tailed Shrew (*Blarina brevicauda*), Pennsylvania.

DR. H. A. PILSBRY. Kangaroo (*Macropus* sp.) Skull, Australia.

RODOLPHE MYER DE SCHAUENSEE. Brazilian Fox, Brazil. Two Saki Monkeys, Brazil.

R. SIMS. Hoary Bat (*Nycteris cinerea*), New Jersey.

ZOOLOGICAL SOCIETY OF PHILADELPHIA. Orang Utan (*Simia satyrus*), Spider Monkey (*Ateles* sp.), Himalayan Tahr (*Hemitragus jemlaicus*); *Viverra malaccensis;* Coypu (*Myocastor coypus*); Tamandua; Hardwick's Hemigale (*Hemigalus hardwickei*), Red Titi Monkey (*Callithrix cuprea*); Young African Elephant (*Elephas africanus*); Young Hippopotamus (*Hippopotamus amphibius*).

BIRDS

ACADEMY NEVADA-ARIZONA EXPEDITION 1924. Three skins of the Piñon Jay (*Cyanocephalus cyanocephalus*).

EDWARD ALLEN. Young Starling (*Sturnus vulgaris*), Pennsylvania.

WILLIAM L. BAILY. Crow (*Corvus b. brachyrhynchos*), Pennsylvania.

T. E. BAIRD, JR. Yellow-billed Cuckoo (*Coccyzus a. americanus*), Penna.

MRS. LUDWIG BAKER. Case of Mounted Birds.

JOSEPH BROWN. Three eggs of Water Hen (*Gallinula chloropus*), Ireland.

CHARLES M. B. CADWALADER. Ninety-nine specimens of Ducks, seventeen Canada Geese and two Marbled Godwits, North Carolina.

THOMAS A. CLOUGH. Collection of Mounted Birds and Mammals.

I. NORRIS DE HAVEN (Estate). Five hundred and seventy-six bird skins, Pennsylvania.

H. T. GREEN. English Sparrow, young albino (*Passer domesticus*), New Jersey; Purple Martin (*Progne subis*), New Jersey.

FRANK T. HAINS. Sparrow Hawk (*Falco sparverius*), Pennsylvania.

WHARTON HUBER. Forty-nine bird skins from Corson's Inlet, New Jersey.

PERCY C. MADEIRA. Maribou Stork (*Leptoptilus crumeniferus*), Africa.

F. GUY MEYERS. Little Blue Heron (*Florida caerulea*), New Jersey.

ALLISON L. MOFFETT. *Parus major minor, Emberiza f. fucata, Emberiza s. spodocephala*, China.

J. P. NORRIS, JR. Argentine House Wren (*Troglodytes hornensis*), Argentine Republic.

C. H. NEWCOMB. European Widgeon (*Mareca penelope*), Virginia.

MRS. S. L. OBERHOLZER. Collections of birds' eggs, North America and Tasmania.

PURCHASED: Collection of Chinese birds (through A. L. Moffett); Collection of African birds, Tanganyka Territory (from Arthur Loveredge); Collection of Mexican birds (from Thomas S. Gillin).

RODOLPHE M. DE SCHAUENSEE. Two Hoopoes (*Upupa epops*).

LEE SINER. Mounted specimen Kiwi (*Apteryx oweni*).

J. W. SMITH. Barn Owl (*Tyto pratincola*), Pennsylvania.

JAMES SPEAR. Sharp-shinned Hawk (*Accipiter velox*); Two Virginia Rails (*Rallus virginianus*), Pennsylvania.

DR. WITMER STONE. Osprey (*Pandion h. carolinensis*); Bonaparte's Gull (*Larus philadelphia*), Cape May, New Jersey.

ZOOLOGICAL SOCIETY OF PHILADELPHIA. White-crested Turacou (*Turacus corythaix*); Rhea (*Rhea americana*); Black Swan (*Chenopsis atrata*); Two Semipalmated Geese (*Anseranas semipalmata*); Whooping Swan (*Olor cygnus*); Sonnerate's Jungle Fowl (*Gallus sonnerati*); Bush Turkey (*Catheturus lathami*); Gray Turacou (*Schizorhis concolor*); Kagu (*Rhinochetus jubatus*); Illiger's Macaw (*Ara maracana*); Roseate Cockatoo (*Cacatua roseicapilla*); European Raven (*Corvus corax*); Red-sided Eclectus Parrot (*Eclectus roratus*); Gray-headed Porphyrio (*Porphyrio poliocephalus*); Crested Eagle (*Spizaetus tyrannus*); Two Spectacled Owls (*Pulsatrix p. perspicillata*); Orange-breasted Hobby (*Falco deiroleucus*); Shaft-tailed Magpie (*Cryptorhina afra*); Bauer's Parrakeet (*Barnardius zonarius*); Undulated Grass Parrakeet (*Melopsittacus undulatus*); Spot-billed Toucanet (*Selenidera maculirostris*); Cackling Goose (*Branta canadensis minima*); Gadwall (*Chaulelasmus streperus*); Regent Bower Bird (*Sericulus chrysocephalus*); Red-vented Parrot (*Pionus menstruus*); Parrakeet (*Aratinga aeruginosus*); Two Crested Ground Parrakeets (*Leptolophus auricomis*); Yellow-headed Troupial (*Agelaius icterocephalus*); Guatemalan Green Jay (*Xanthoura guatemalensis*); Greater Shearwater (*Puffinus gravis*); Two Gannets (*Sula bassana*); Rhea (*Rhea americana*); Casuary (*Casuarius galeatus*); Black Swan (*Chenopsis atrata*); Whooping Swan (*Olor cygnus*); Two Semipalmated Geese (*Anseranus semipalmata*); Hornbill (*Anthrocothorax convexus*); Green-thighed Parrot (*Pionites leucogaster*); Yellow-headed Minah (*Ampeliceps coronatus*); Gadwall (*Chaulelasmus streperus*).

REPTILES

ACADEMY NEVADA-ARIZONA EXPEDITION 1924. Two Rattlesnakes; two Lizards, Nevada.

MISS HARRIET HAND. Hog-nosed Snake, Cape May, N. J.

HENRY W. FOWLER. Two lots Salamanders, Pennsylvania; one lot Salamanders, Japan and Europe.

MISS CLARA E. NELL. Collection of Reptiles.

WILLIAM SELLERS. Milk Snake (*Lampropeltis doliatus clericus*), Pennsylvania.

DR. FRANK G. SPECK. Toad (*Bufo sp.*), Labrador.

DR. WITMER STONE. Two Box Tortoises, Cape May, N. J.

R. W. WEHRLE. Salamander Eggs and Purple Salamanders (*Gyrinophilus porphyriticus*), Indiana, Pennsylvania.

MISS HEPSEY N. WELLS. Box Tortoise (*Terrapene c. carolina*).

ZOOLOGICAL SOCIETY OF PHILADELPHIA. Frog (*Leptodactylus*); Stump-tailed Lizard.

FISHES

HENRY W. FOWLER. Three jars fishes, Pennsylvania.

H. R. HILL. Fishes, Southern California.

WHARTON HUBER. Three fishes, New Jersey.

NATAL FISHERIES COMMISSION. Collection of fishes, South Africa.

PURCHASED. Collection of three hundred and fifty fishes from India.

PURCHASED. Collection of fishes, New Zealand.

ROYAL MUSEUM, MONTREAL. Fresh water fishes, Canada.

PROF. ALBERT ULREY. Collection of fishes, Southern California.

INSECTS

DR. WILLIAM L. ABBOTT. One beetle, San Domingo; four Lepidoptera, San Domingo.

ACADEMY, ARIZONA-NEVADA EXPEDITION OF 1924. Nine hundred Orthoptera. Utah, Nevada, California and Arizona.

AMERICAN MUSEUM OF NATURAL HISTORY. Seventy-three Blattidae with paratypes of nine species, West Indies.

WILLIAM BARNES. One *Basilarchia nevadae* (paratype), Nevada.

ERNEST L. BELL. One Hesperid, Formosa; one hundred and fifty-seven Hesperiidae, Japan and Idaho.

HENRY BIRD. Five moths, *Papaipema*.

F. E. BLAISDELL. Sixty Coleoptera, California; sixty-seven Coleoptera, California.

PROF. T. D. A. COCKERELL. Thirty-one species of bees, United States and East Indies; three Odonata, Western United States.

W. J. COXEY. Two *Attacus;* two *Charagia lignivora*, Queensland, Australia.

G. B. CRESSON (ESTATE). Seven hundred specimens of Hymenoptera, Brazil.

M. L. CRIMMINS. Specimens *Stipator* and *Phrynotettix*, Oklahoma and New Mexico.

C. H. CURRAN. Eight specimens of Diptera (*Argyra* and *Rhaphium*), Canada; ten specimens of insects, Canada; twenty-nine specimens of Diptera, United States.

FRANK S. DAGGETT. Collection of Coleoptera, Western United States.

FRANK B. FOSTER. Specimen *Tenodera sinensis*, Pennsylvania.

HENRY W. FOWLER. One grasshopper, Pennsylvania.

WILLIAM J. FOX. Specimen of cicada, Delaware.

MORRIS M. GREEN. One flea.

FRANK HAIMBACH. One *Melanargia palaestinensis*, Palestine.

H. C. HALLOCK. Sixteen insects, North Dakota and New York.

MORGAN HEBARD. Seven hundred and thirty-five Lepidoptera, Maine; twenty-three Insects, Maine; three hundred and thirty-six moths, Western States; twelve specimens Diptera and Hemiptera, Mexico.

WALTER HORN. Twenty-three Hesperiidae, South America.

WHARTON HUBER. Twenty specimens *Phaleria testacea* Say, New Jersey.

W. H. HOFFMAN, *Oedionychis obsidiana* Fol., Maryland.

C. W. JOHNSON. Forty specimens of Diptera, eastern United States and Galapagos Islands.

PEDRO JORGENSEN. Five hundred and fifty Hesperiidae, Paraguay. Purchased.

PHILIP LAURENT. Two *Pamphila massasoit* (Types), New Jersey; five moths, Pennsylvania.

ALEXANDER H. LEIGHTON. Two Coleoptera, Pennsylvania.

CHARLES LIEBECK. Eleven Orthoptera, Pennsylvania.

BAYARD LONG. Thirteen Orthoptera, Newfoundland.

J. O. MARTIN. *Mecas bicallosa* (paratypes), California.

DR. ROBERT K. NABOUS. Eight *Parotettix cucullatus*.

DR. H. A. PILSBRY. One *Cychrus*, Vancouver.

FRANCIS J. PURDY. Six specimens *Diestrammena japonica*, Pennsylvania.

C. T. RAMSDEN. Five Dermaptera, Cuba; nine Orthoptera, Cuba.

J. A. G. REHN. *Labia minor*, Philadelphia, Pennsylvania.

RODOLPHE M. DE SCHAUENSEE. Eight *Coleoptera*, Brazil; Leaf-cutting Ants, Brazil.

F. W. SCHMOE. Twenty-five Lepidoptera, Washington.

W. H. SHOEMAKER. Ninety-one Lepidoptera, Alaska. Purchased.

DR. HENRY SKINNER. Thirty-six Hesperiidae, Neotropical.

ALFRED C. STEINHOFF. *Mutilla occidentalis* L., New Jersey.

DR. WITMER STONE. Two Diptera, New Jersey.

J. F. TRISTAN. Collection of insects, Inazo, Costa Rica.

UNITED STATES NATIONAL MUSEUM. One hundred and twenty Micropezidae North and South America; two specimens of Diptera, Idaho; seven Blattidae (paratypes of three species), West Indies; six *Scatella brunipennis* (paratypes).

E. G. VANATTA. Post Oak Locust, *Dendortettix quercus*, Pennsylvania.

M. C. VAN DUZEE. Fifteen specimens of Diptera, North America.

H. W. WENZEL. Two *Donacia edentata*, New Jersey.

R. C. WILLIAMS, JR. Three hundred and thirty-four Rhopalocera, United States.

MISS J. WILLIS. Six Orthoptera and two Odonata, Kentucky.

RECENT MOLLUSCA

DR. W. L. ABBOTT. *Polygyra albolabris* Say from Elk Neck, Maryland.

H. J. AITKIN. Two species of fresh-water shells from New York.

AMERICAN MUSEUM OF NATURAL HISTORY. Seventy-seven trays of African shells.

AUSTRALIAN MUSEUM (Exchange). *Cypraea umbilicata* Sowb. from Tathra, New South Wales.

J. L. BAILY, JR. Seven trays of fresh-water shells from California and Pennsylvania.

DR. H. B. BAKER. Sixteen trays of European shells.

MRS. W. L. BAKER. A collection of marine shells.

DR. J. BEQUAERT. One hundred and seventy trays of shells from Africa and America.

E. W. BERRY. Nine trays of fresh-water shells from Lake Titicaca.

DR. S. C. BISHOP. *Anodonta cataracta* Say from Cinnamon Lake, New York.

T. W. BOUCHELLE. Eight trays of shells from Nicaragua and Cuba.

E. P. CHACE. Four species of mollusks from California.

JAMES B. CLARK. Fifty-three trays of shells from the eastern United States.

G. H. CLAPP. Five species of land shells from Florida and Texas.

W. J. CLENCH. Four trays of fresh-water shells from the southern United States.

PROF. T. D. A. COCKERELL. Three Asiatic land shells.

MAJ. N. CONNOLLY. Two African land shells.

REV. H. CROCKER. *Macoma* from Vermont.

PROF. C. R. CROSBY. Five species of mollusks from Colorado.

S. G. CRUMP. Type of *Bathybembix crumpi* Pils. from Japan.

T. T. DRANGA. *Conus millepunctatus* Lam. from Oahu Island.

W. EYERDAM. Fifteen trays of shells from Washington.

J. H. FERRISS. One hundred and thirty-nine trays of land shells from Texas.

MISS E. W. FISHER. *Elliptio complanatus* Dillw. from East Union, Maine.

J. M. FOGG, JR. Three species of fresh-water shells from Taylor, New Jersey.

MRS. H. W. FOWLER. Six marine shells from California.

H. W. FOWLER. Eight fresh-water shells from Michigan.

W. W. FROGGATT. Sixteen species of land shells from the New Hebrides.

C. J. GABRIEL. Seventy-four trays of Australian shells.

H. GARMAN. Three fresh-water shells from Kentucky.

PROF. T. R. GARTH. *Rumina decollata* L. from Texas.

J. H. GATLIFF (Exchange). One hundred and twenty-five trays of Australian shells.

H. GREEN. Three marine shells from Beach Haven, New Jersey.

A. HAYCOCK. Six trays of *Poecilozonites* from Bermuda.

MORGAN HEBARD. Two fresh-water shells from Maine.

C. HEDLEY. Two land shells from Norfolk Island.

J. B. HENDERSON. Six land shells from Cuba and Florida.

W. HUBER. Sixteen land shells from New Jersey and Pennsylvania.

INDIAN MUSEUM (Exchange). Six fresh-water shells from China.

R. W. JACKSON. Seven trays of shells from India and America.

H. LANG. Seven species of mollusks from British Guiana.

A. H. LEIGHTON. Fifteen species of land shells from Tramore, Ireland.

DR. M. D. LEONARD. *Helix pisana* Müller from Valencia, Spain.

B. LONG. Twenty-seven trays of American shells.

H. N. LOWE. *Epiphragmophora lowei* Bart. from San Diego County, California.

J. G. MALONE. Fifteen trays of shells from West America.

D. P. MANNIX. Five species of Cuban shells.

E. S. MARKS. Five trays of shells from New Jersey.

MISS A. J. MCCORMICK. *Harpa major* Röd.

M. MCCOY. A collection of shells.

DR. H. B. MEREDITH. Four trays of shells from Virginia and Pennsylvania

DR. G. E. MEYER. *Helix aspera maxima* Taylor from the New York City markets.

ROBERT C. MILLER. Three species of Pacific *Teredo.*

PHILIP NELL. One abnormal *Alasmidonta.*

M. OSHIMA. Six species land shells from the Philippine Islands.

LT. COL. A. J. PEILE. Four trays of *Melampus* from India.

C. A. PERRY. *Tritonalia cellulosa* Conr. from Sanibel Island, Florida.

REV. J. E. PETERS. Forty-seven trays of shells from the east coast of America.

H. A. PILSBRY. Seven hundred and sixty trays of Australian shells.

H. W. PRETZ. *Gastrodonta suppressa* Say from Center Valley, Pennsylvania.

DR. R. W. PULLEINE. Fourteen trays of Australian marine shells.

PURCHASED. *Lauria milleri* Dohrn. from Cape Verde Islands.

QUEENSLAND MUSEUM. Three species of Queensland marine shells.

J. A. G. REHN AND M. HEBARD. Five trays of shells from west America.

S. N. RHOADS. Sixty-six trays of shells from southeastern United States.

S. RAYMOND ROBERTS. Eggs of *Buccinum.*

R. M. DE SCHAUENSEE. Two Brazilian land shells.

SENCKENBERGISCHES MUSEUM (Exchange). Twelve trays of land shells.

DR. WITMER STONE. *Elliptio complanatus* Dillw. from Marlton, New Jersey.

O. H. SWEZEY. Five species of Australian marine shells.

DR. W. R. TAYLOR. Sixteen species of marine shells from Dry Tortugas, Florida.

A. E. J. THACKWAY. Sixty-three Australian marine shells.

T. A. THURSTON. Four Pacific marine shells.

UNIVERSITY OF MICHIGAN. One hundred and twenty trays of shells from Mexico and Dutch West Indies.

U. S. NATIONAL MUSEUM. *Blanfordia bensoni* Ad. from Ojima, Japan.

E. G. VANATTA. Four marine shells.

T. VAN HYNING. Fifteen trays of shells from Bahama Islands and Florida.

DR. BRYANT WALKER. Thirteen trays of shells.

J. B. WALTER. *Gibbula obliquatus* Gmel. from Penmarch, France.

MISS MARY H. WILLIAMS. *Gonyodiscus c. anthonyi* Pils. from California, Pennsylvania.

OTHER INVERTEBRATES

R. M. BOHART. Three barnacles from Washington.

C. J. GABRIEL. Magellania flavescens Lam. from Western Port, Victoria.

H. WALKER HAND. Five Star Fish, Cape May, New Jersey.

J. B. HENDERSON. One species of *Verruca* from Florida.

A. F. B. HULL. Eight Queensland barnacles.

R. W. JACKSON. Two *Balanus* from Maryland.
J. G. MALONE. Four barnacles from Oregon and Washington.
DR. H. A. PILSBRY. Twenty-four jars of Australian invertebrates.
DR. R. H. PULLEINE. One *Balanus* from New South Wales.
S. RAYMOND ROBERTS. *Balanus tintinnabulum* L.
U. S. FISH COMMISSION. Six American barnacles.

FOSSIL INVERTEBRATES

DR. P. P. CALVERT. Three fossils, Germany.
J. B. CLARK. Thirty-one trays of fossils from Ballast Point, Florida.
REV. H. CROCKER. A collection of Pleistocene fossils from Vermont.
SENCKENBERGISCHES MUSEUM (Exchange). Twelve European fossils.

PLANTS

HENRY ABBOTT. Two specimens from Florida and *Cirsium canadense* var *vestitum*.

MRS. ROBERT ARMSTRONG. *Ranunculus repens* var. *plentiflora* from Biglerville, Adams County, Pennsylvania.

FRANK BALL. *Cypripedium pubescens* and *Brachyelytrum erectum* from Bucks County.

GEORGE WILLIAM BASSETT. Twenty-one specimens from New York, New Jersey, Pennsylvania, and Long Island.

GEORGE WILLIAM BASSETT AND A. T. BEALS. One hundred specimens from Alloway, New Jersey.

A. T. BEALS. Two specimens from New Jersey.

WALTER M. BENNER. Fifty specimens from Bucks County, Pennsylvania.

O. H. BROWN. Fifty specimens from Cape May County; one hundred and fifty cultivated plants.

COLORADO STATE MUSEUM. Twenty-two specimens from Colorado.

JOSEPH CRAWFORD. Three hundred specimens from Georgia, Florida and southern New Jersey.

MRS. T. B. DALLAS. Eight hundred specimens of phaenerogams and one hundred fungi from New Jersey and New York.

C. C. DEAM. Three hundred and forty-six specimens from Indiana.

R. R. DREISBACH. One hundred and fifty specimens from New Jersey and Pennsylvania.

W. DUDGEON and L. A. KENOYER. Six hundred specimens from India.

C. C. EPLING. Twenty-seven specimens from Montana, Idaho, and Oregon.

J. M. FOGG. One hundred and four specimens from New Jersey and Pennsylvania.

MRS. J. M. FOGG. Forty specimens from China.

DR. C. D. PRETZ. Sixty-one specimens from Bucks County, Pennsylvania.

GRAY HERBARIUM. One thousand and fifty-two specimens from United States and fifty-four from Gaspé County, Quebec.

DR. H. HAPEMAN. Thirteen specimens from Nebraska, Wyoming, Colorado, California and British Columbia.

R. M. HARPER. Twenty-six specimens from Alabama and Florida.

MORGAN HEBARD. Series of Hawaiian specimens.

RALPH HOFFMANN. Five specimens from Berkshire County, Massachusetts.

WHARTON HUBER. Two specimens of Fagus from Treasure Island, Delaware River.

INSTITUT F. ALLGEMEINE BOTANIK, Hamburg, Germany. Two hundred and sixty-one specimens from Borneo.

GEORGE JOHNSON. Twenty-seven specimens from New Jersey and Pennsylvania.

DR. A. A. JONES. *Quercus falcata* from Alloway, N. J.

HILDA KAJI. Nine specimens from Mowers, Salem County, New Jersey.

CLARA KAST. Six specimens from Mowers, Salem County, New Jersey.

A. P. KELLEY. Fifty specimens chiefly from Chester County, New Jersey.

P. B. KENNEDY. Thirteen specimens from Nevada.

C. H. KNOWLTON. Sixteen specimens from Massachusetts and New York.

H. A. LANG. Five hundred specimens from Wissahickon Valley.

H. LEFFMAN. Seven specimens from Australia and England.

CHARLES D. LIPPINCOTT. Herbarium of two thousand specimens of flowering plants and ferns (with case), and series of mosses determined by E. G. Britton.

BAYARD LONG. Two thousand specimens from New Jersey, Pennsylvania and Delaware.

A. MACELWEE. Twenty-five specimens from West Virginia.

F. T. MCFARLANDS. Ten specimens from Kentucky.

DR. H. B. MEREDITH. Nine hundred and eighty-two specimens from U. S. A. and West Indies.

MISSOURI BOTANICAL GARDEN. Two hundred and ten specimens from Missouri.

NATIONAL PARK SERVICE. Eighteen specimens from Yellowstone Park, Wyoming.

J. C. NELSON. Ninety-two specimens from Oregon.

NEW YORK BOTANICAL GARDEN. Two hundred and twenty-eight specimens from U. S. A., West Indies and South America.

G. E. OSTERHOUT. Ten specimens from Colorado.

J. P. OTIS. One hundred and ninety specimens from Maryland and Delaware.

T. CHALKLEY PALMER. Two specimens of *Potomogeton* from Delaware County, Pennsylvania and *Hieracium Muronum* from Delaware County, Pennsylvania.

J. R. PENNELL. Fifty specimens from Pennsylvania.

J. E. PETERS. Herbarium of one thousand specimens.

H. A. PILSBRY. Four specimens from Sydney, Australia.

JOHN U. D. PLEASANTS. *Rubus phoenicolasius* from Darby Creek near Clifton, Pennsylvania.

H. W. PRETZ. *Azalea rosea* from Carbon County, Pennsylvania, and four hundred specimens from Lehigh County, Pennsylvania.

GEORGE REDLES. Eleven specimens from Pennsylvania and New Jersey.

HAROLD G. RUGG. *Adiantum pedatum* var. *alenticum* from Vermont.

H. H. RUSBY. Twenty-six specimens from Bolivia.

GERTRUDE H. SMITH. *Pinus rigida* from Audubon, New Jersey.

LEE SOWDEN. One specimen from Tennessee.

R. R. STEWART. One thousand forty-six specimens from Texas, India and Kashmir.

H. E. STONE. Fifty-five specimens from southern New Jersey and Chester County, Pennsylvania.

DR. WITMER STONE. *Arabis glabra* from Cape May Point, New Jersey.

B. C. THARP. Five specimens from Texas.

WILLIAM TRIMBLE. *Solium temulentum*, and several series of ferns from Concord, Delaware County, Pennsylvania.

HARRY W. TRUDELL. Specimens of *Elliottia racemosa*.

U. S. NATIONAL HERBARIUM. Two thousand three hundred and twenty-seven specimens.

UNIVERSITY OF VIENNA. One hundred and ninety-eight specimens from Europe.

UNIVERSITY OF WYOMING. Four hundred and ninety-three specimens from Middle West, U. S. A.

E. G. VANATTA. Thirteen specimens from Bermuda.

S. S. VAN PELT. Seventeen specimens from Chestnut Hill, Philadelphia, Pennsylvania.

CLARENCE E. VARNUM. Five specimens from salt marshes of Pleasantville, New Jersey.

J. B. WALTER. Five specimens from Peermont, New Jersey.

T. O. WEIGEL. Four hundred and seventy-seven specimens from Europe and Nyassa.

DR. EDGAR T. WHERRY. Specimen of *Ophioglossum vulgatum* var. *minus* from Browns Mills, New Jersey.

C. B. WILLIAMS. Series of specimens from Oklahoma.

MISS MARY H. WILLIAMS. *Butomus* from Montreal and two hundred specimens from Pennsylvania, New Jersey and New York.

MR. WOBENSMITH. Two specimens of *Fagus* from Treasure Island, Delaware River.

MINERALS AND ROCKS

PURCHASED. 72 specimens.

EXCHANGED. 26 specimens.

M. G. BIERNBAUM. Analcite, Nova Scotia; cassiterite, Irish Creek, Virginia; inyoite, New Brunswick.

J. S. FRANKENFIELD. Fibrous quartz, Rhode Island; gmelinite, Nova Scotia.

CHARLES PALACHE. Suite of minerals, Quincy, Mass.

SAMUEL G. GORDON. Minerals from French Creek mines, Franklin, N. J., Moore Sta., N. J., and Branchville, Conn.

J. F. SCHAIRER. 3 Connecticut minerals.

EUGENE POITEVIN. Camsellite.

FREDERICK HILBIBER. Minerals from Perkiomenville, Penna.
GEORGE VAUX, JR. Apophyllite, French Creek mines.
O. B. BÖGGILD. Leifite and ussingite, Greenland.
L. J. SPENCER. Hydrocerrusite, mendipite, diaboleite, chloroxiphite.
MRS. J. BERTRAM LIPPINCOTT and MRS. HARRISON S. MORRIS. Malachite.
N. HOSTER AND WILLIAM MADDREN. Apophyllite, French Creek mines.
J. A. G. REHN. Desert varnish, California.
PHILIP P. CALVERT. Volcanic rocks from Eifel, Germany.

APPARATUS

DR. E. GOLDSMITH. A spectroscope and accessories.
SAMUEL G. GORDON. Support for spark terminals; 2 pycnometers.
MRS. HARRISON S. MORRIS. Herbert Smith refractometer (deposited).
GEORGE VAUX, JR. Spark coil (deposited).
DR. THOMAS S. STEWART. X-ray apparatus (deposited).

ARCHEOLOGY

MISS GERTRUDE ABBOTT. Samoyed shoes.
DR. WILLIAM L. ABBOTT. 4 baskets, 2 combs, Tananarivo, Madagascar.
JACOB ABLEY. Bird house of cane. Native make. Amazon Valley.
MRS. J. D. CHANDLER. Chinese medicine.
J. B. CLARK. Part of Lei, Society Islands.
THOMAS A. CLOUGH. Archeological material from Egypt, Italy, Ireland and Mexico.
GEORGE FOX. Bow and 3 arrows, British Guiana.
CHARLES HEDLEY. Forehead ornament worn by men, Australia.
FRANK HOWELL. Carved bow, probably South America.
LOGAN MUSEUM, BELOIT COLLEGE (In exchange). 6 quartzite points, Michigan.
MRS. —— MCCOY. Egyptian and Phoenician antiquities.
REV. J. E. PETERS. Projectile points and sherd.
DR. H. A. PILSBRY. Womera (throwing stick), Queensland, Australia.
SOUTHWEST MUSEUM, LOS ANGELES (In exchange). 120 pieces representing the ancient culture of Channel Islands and coast of California.
E. G. VANATTA. 3 necklaces of shells, Lacepede Islands, Northwest Australia.
BY PURCHASE. 136 Eskimo bone and ivory carvings, St. Lawrence Islands, Alaska.

Special Reports by Members of the Scientific Staff

NARRATIVE OF A JOURNEY IN LANDS BORDERING ON THE WESTERN PACIFIC OCEAN

BY SPENCER TROTTER

To one with some knowledge of faunal zoology a journey into a strange country is fraught with more than passing interest. In the spring and early summer of 1923 I travelled, without any design toward scientific observations or of collecting natural history material, in parts of the Eastern Chinese region, Malaysia, and the northern and eastern coasts of Australia. Throughout the journey I took note, in a general way, of the human and animal life of the region through which I passed, with special reference to the various types of birds. I made no elaborate attempt at note-taking and kept no journal; my records of places and scenes were caught through the camera and my observations, here presented, are in the main the result of impressions with some jottings as to the characteristics of birds seen in passing.

Crossing the Straits of Korea from Japan (a one-night steamer run) we landed at Fusan, the principal seaport of Southern Korea ("Chosen" as the Japanese call the entire country) from which port we took the train on the morning of May 7th for the Korean capital—Seoul, the Japanese name of which is "Keijo." An excellent railway under Japanese control runs through a rugged land of bare hills, encircling broad stretches of flat country with a wide river here and there. There has evidently been much deforestation in the past, and as I learned later from a Japanese who was travelling on the same train, it is only in the northern portion of the peninsula that forests are still standing. In these forests the leopard is a fairly common animal (later in the zoological garden at Seoul I saw a fine specimen from this region). The country had a very wild appearance and in the bright sunlight of that May morning the colors and cloud shadows on the distant hills, bare of any trace

UPPER.—Camels at the Great Wall.
LOWER.—Plowing—North China.

of woodland, were wonderfully beautiful. From time to time we passed villages, the houses with thatched roofs and mud walls huddled together, often at the foot of a hill. There seemed to be much terrace cultivation and the rice fields in the low lands were flooded, the sludge of which was being plowed in preparation for planting the crop. The beast of burden and work throughout the Korean countryside appears to be the bull (a black variety), and men and women in their peculiar costumes of white (rather dirty white) were wading through this black muck, busy with the tillage and planting. On the drier stations above the rice fields the principal crop appeared to be barley. It was altogether a primitive scene, the same that a traveller might have witnessed a thousand years ago. At the stations one got a closer view of the people, the men with their long white coats and curious hats; the married man wears a high and narrow pot-like hat which is perforated all over like a wire fly-screen perched on the head and held in place by a band or string tied under the chin; a man in mourning wears a broad white structure like an inverted bowl. The men smoke pipes—a small metal bowl and a long reed stem with a metal mouth-piece. I tried one and found it very hot smoking. The women dress also in white, with long skirt and a short jacket or waist, so cut as to leave the middle of the torso bare, thus allowing a child to nurse as it sits astride its mother's hip while she goes along the way or about her work. The men have scanty beards and rather long faces; the women have flat faces and are from our point of view extraordinarily homely.

One of the most abundant birds in the near-by landscape was the magpie (*Pica pica sericea*) its strikingly contrasted color pattern of white and lustrous green-black making it everywhere conspicuous. I greeted the bird as an old friend, for I had delighted in its beauty, its jauntiness and its attractive ways years before on the "downs" above Shanklin in the Isle of Wight, in Ireland, and in the Cornish Country, where it occurs as a slightly different geographic race and stranger still, it was essentially the same magpie that I had seen a few weeks before in the timber along the Platte in Nebraska and among the peaks of the Wasatch range in Wyoming (*Pica p. hudsonica*). One felt a sense of homeness by its presence in this strange and far-off country. I have often pondered

over the distribution of this bird. It seems to have associated itself with man and his movements. Here in Korea it is about the villages, and later I found it very common throughout China and just as conspicuous as it is in the British Isles, in Sweden, and elsewhere in Europe. Northward it has spread into Lapland and is found all the way across Asia to Kamschatka, and it greets one in Alaska, and along the Yellowstone and Missouri drainage the same old charming magpie, bringing a touch of Asia and Europe into America from the West, but beyond the Missouri it has only occasionally been seen. Is it a comparatively recent immigrant into America? It may have followed the hunting and fishing folk out of Eastern Asia ages ago. Will it eventually find its way eastward to the Atlantic shores? I hope so—this engaging bird, a far traveller, a bit of a thief, full of tricks and jokes, a great figure in our old-world literature and altogether companionable.

Another bird seen along the way about the flooded rice lands and river shores was the heron, in the near landscape much like our great blue heron with the same general coloration, but not quite so large a looking bird, rising from marshy places with its slow flight and broad flapping wings. I saw them later in Peking, against the evening light, leisurely flying over the city to some "heronry."

On the night of the ninth we reached the north-west frontier of Korea at Antung and shortly after crossed the famous Yalu River into Manchuria. The next morning a very different landscape greeted us. In place of the rugged, mountainous land of Korea we looked out, beyond the Yalu, on a level country that stretched away in monotonous flatness to the horizon. The Manchus are a very different people from the Koreans; both men and women are tall and fine-looking and their garments are of a bluish, coarse material—smocks, jumpers and trousers—a decided contrast to the white clothes and long coats of the Korean folk. Here and there small groups were plowing with horses and asses often yoked together—a horse and ass in the same team. Early in the forenoon we reached Mukden, the capital of Manchuria, a great city with a teeming population crowding its streets. Carts, automobiles, and rickshaws threaded their way among the throngs of pedestrians, the tinkling of the rickshaw bells sounding quite musical. The carts are hauled by scrubby Manchurian ponies of the steppe type—

FALCONS.—NORTH CHINA.

MANCHUS FALCONER.

one horse in the shafts and usually three abreast in the lead, the traces being of rope hitched to axle and hub. The wheels are heavy affairs, the spokes of two solid cross-pieces. Some of the lighter sort have a tent-like cover in which the family travels, the driver sitting at the base of one shaft. A single horse or mule drew these covered carts. All of the carts were painted blue and variously studded with large brass-headed nails. The population at large was typically Mongolian in appearance, of a light bronze color with straight, glossy, black hair, the men frequently wearing the 'pig-tail' or queue and the women with remarkable-looking combs. The town is full of many ancient temples and also monuments of a later date; the streets are lined with open-front shops where industries of every kind are carried on. One man we met had a large pole slung over his shoulder from either end of which were hung cages filled with birds. Some of these appeared to be finches of species I did not recognize, but there were larks of the shore-lark type that kept up a constant twittering and singing. This species I found later to be a very common cage bird. It was rather a stout bird, somewhat larger than our shore lark, with a black crescent on the breast and a broad head with characteristic "horns." These Manchus and the Chinese generally are seemingly very fond of keeping cage birds; one frequently notices them hung in the shops and houses and men are often seen carrying these cages about to give their birds an airing, just as the occidental peoples take their dogs for a walk. It may be also that the oriental mind regards a bird as likely to embody the spirit of some departed ancestor and this care and attention has a possible religious basis. This habit of keeping cage birds is by no means confined to China; most western peoples take a similar delight in having these attractive little creatures immured in the home and later, while travelling in Java, we saw poles with shields placed over their tops as a sun protection where the cages were pulled up by means of a pulley. We had already seen at Nikko in Japan a large hawfinch much like the European form (*Coccothraustes*) in a cage. The Manchus still carry on the old sport of falconry, most likely flying their hawks at herons. I did not see any of these hawks alive, but they probably belong to the wide-spread peregrine type.

Journeying on to Peking, which city by the way is in the same

latitude as Philadelphia and similarly situated on the eastern seaboard of a great continent, we passed through a flat coastal plain country with much loess that formed banks or drifted as a fine dust. The land appeared fertile, and a variety of willow was growing in places where magpies disported themselves and some rooks (*Corvus frugilegus pastinator*) were flying about the fields. Dark, wolfish-looking dogs hung around the villages and stations. The horses that we saw were of the steppe type, white or "clay-bank" being the prevailing color. Large black pigs with long hair were common. Sheep, bullocks and donkeys were also in evidence. The villages are of flat-roofed houses, some of them built of stone. Fences are made of reeds bound very closely together and the loess appears to make a good mud wall. A number of curious looking mounds were noticed clustered together here and there in the fields where the people were plowing and sowing. Each one of these mounds, which were bee-hive in shape, had a small piece of clay or hardened mud on its top. Later we learned that they were graves, the Manchus and Chinese burying their family dead in such tumuli on their farms. A deceased person is kept for some time in certain mortuary places (called "Cities of the Dead") until the priest or shaman indicates the spot on the homestead where the spirit of the departed will ultimately be at rest.

Between Tientsin and Peking we saw our first camels—a string of a dozen or more travelling the road with loads on their backs—the two-humped or Bactrian species—and from now on they were a common sight as a beast of burden all the way to the watershed of the Yang-tze-kiang.

Words fail to describe the glamour of this ancient city of Peking. It is a city of trees, and from the vantage of some high point one looks down on a mass of green leafage beneath which moves and lives a vast human population. Above this leafy fold rise here and there the blue and gold domes of old temples and the towers—the "Temple of Heaven" with its "altar" and "Temple of the New Year" (Ming Dynasty), the "Drum Tower" and the "Bell Tower." The common and most abundant tree in Peking was the acacia or locust, at the time of our visit in fragrant bloom. In the Old Palace Gardens one heard unidentified bird songs, and on marvellously executed screens in the Old Palace itself there were many fine

pictures—one of ducks and of hawks, and on another was a well-drawn and easily recognized picture of the Bohemian waxwing (*Bombycilla garrula*). In the streets were many sparrows of the House Sparrow type, seemingly the same old *Passer domesticus*. Ravens and crows (one of the latter a gray-naped individual) were seen, and about the hotel the ubiquitous magpie. Many swifts were flying about as the sun went down behind the "Western Hills."

On the evening of May 22nd, after visiting the Great Wall at the Nancow Pass where the vast stretches of Inner Mongolia begin, and a journey by sedan chair into a remote country of hills to the ancient tombs of the Ming Dynasty, we left for Nanking, passing through the recently disturbed bandit section. On the afternoon of the 23rd the water buffalo and the rice fields began to appear, both characteristic of China from the Yang-tse southward. At ten o'clock that night we crossed the ferry (about a mile wide) from Pukow to Hsiakwan, the treaty port of Nanking, the old walled capital of China which lies five miles back from the river. Here we encountered the mynahs (*Gracula*) a genus of the Sturnidæ, which we had first noticed as an introduced species in Honolulu where they thrive exceedingly. They are dark-colored birds and the most striking features about them are the large fleshy caruncles of a bright orange color just back of the eyes. There was a large species about the size of our grackle with a short-tail, and another smaller species. These curious birds were now in evidence everywhere about towns and villages; some individuals are said to talk, in fact I have heard captive ones talk in the zoological gardens, Regent's Park, The mynah nests in cavities in the old walls and in tree holes. They are always noisy, restless and assertive.

On the 25th of May we took the train for Shanghai, traversing the fertile plain of the Yang-tze-kiang. Along the way rice-planting was in progress; men on rude tread mills laboriously lifting water out of the ditches to flood the paddy fields. In these ditches an occasional water buffalo was seen half submerged or wallowing in the mud. From the line of the railway one caught glimpses of primitive threshing floors near homesteads. Late in the afternoon as the train crossed one of the many small creeks of this tidal land, some men in a scow-like boat were seen punting down stream, and

on the sides of the boat sat a number of cormorants being taken out to deeper waters for the evening fishing. It was a chance sight of a characteristic Chinese scene. Everything about this Chinese countryside was primitive, fascinating and picturesque; the same scenes that morning, noon and evening had witnessed unchanged for a thousand years and no one knows for what untold ages before—the continuous, uneventful life of an ancient people, generation after generation on the soil of this old, intriguing land. It was as it had always been, for time had stopped and the spell had not been lifted—it was still a "cycle of Cathay."

Birds, as always, formed part of the ancient scene, for where man and his harvests are there birds gather. Very abundant were the same magpies and there was a species of crow, with a whitish nape and a white band on the breast (*Corvus torquatus*), that was very common. There were, too, a number of ibis-like birds, white with a brown head and neck, the white very conspicuous as the birds flew over the creeks and rice fields.

Shanghai is a great cosmopolitan city and the Treaty Concessions are like any other of the commercial centers of the world—London, Paris or New York. One feels the influence of the tropics here, warm and moist with much rain. The valley of the lower Yang-tze seems to form more or less of a boundary zone between North and South China. My impression was that in the north a Manchu element prevailed, was the dominant note both politically and as to ethnic character—a more solid conservative China with a desire for the old regime—while Southern China was of unstable and uncertain temper with an infusion of Malay blood. This was emphasized by a certain feeling of unrest and a lurking sense of danger that seemed to prevail especially in the Canton district. The eastern seaboard of China stretches over a wide extent of territory north and south; for example while Peking is in the latitude of Philadelphia, Nanking and Shanghai are a little north of the parallel of Savannah, Georgia, and Canton is almost as far south as Havana. Shanghai is therefore warm temperate. The camel is northern, while the water buffalo, an essentially tropical beast, does not seem to exist to any great extent north of the lower Yang-tze basin. One with a fuller knowledge of the faunal elements of the region than I possess would possibly find other instances to substantiate

this somewhat vague contention of the Yang-tse basin as a boundary between a more northern and a more southern life.

On the beautiful grounds of St. John's College, beyond the "Bubbling Well Road" at the outskirts of the city, I noticed several jay-like birds walking about the lawn—grayish-blue body, a black cap and an extraordinarily long tail of a bluish color (*Cyanopolius cyanus swinhoei*). Another bird—a starling (*Spodiopsar*), about the size of a large thrush with loud and pleasing notes was dark brown, grayish about the throat and head, and with a square-tipped tail. Still another bird, smaller in size and of a greenish shade on back and sides with a white nape and crest (*Pycnonotus sinensis*), was likewise seen on these campus grounds.

It is a far cry to Australia from the Chinese Region, but we voyaged thither from Hong Kong with a stop at Singapore and a week in Java, and then down Wallace's Line between Bali and Lombok into the Indian Ocean, seeing little of the fauna of these parts, save those curious and dangerously poisonous marine snakes of the Hydrophine type that infest these waters, until we reached Port Darwin on the northern coast of Australia. Here bird life again asserted itself. In the wide streets of this frontier settlement, with the "bush" close at hand, the aboriginal "blackfellows" and their "jins" or "lubras" as the women are called, were wandering about clothed in the garb of civilization but still recently out of the "bush" in all their nakedness, with a wild tangle of hair, and both men and women smoking pipes. The Frangapani was in bloom and a fragrant incense filled the nostrils as one passed under the trees. We began to note birds again. A Sacred Kingfisher (*Halcyon sanctus*) lit for a few moments on a telegraph wire. Later came a yellow and bronze-green Bee-eater (*Merops ornatus*) the "rainbow bird" of the colonists, a black band on throat and two elongated tail feathers. On this same telegraph line a pair of Black-faced Cuckoo-Shrikes (*Graucalus novae-hollandiae*), folding first one wing and then another on alighting. On a tree by a shop in the main street I noted a female Mistletoe Bird (*Dicæum hirundinaceum*) one of the family of the Wood Swallows or Flower Peckers. Stalking about the wide streets of the town were several Magpie-Larks or Wood-Shrikes (*Grallina cyanoleuca*), very tame, and quite striking-looking in their black and white color-pattern; they are

variously called "soldiers," "pewits," "pugwalls," "little magpies" and "mud-larks" by the English colonists. Later on, when in New South Wales, I saw the large Piping Crow-Shrike (*Gymnorhina tibicen*) or "Black-backed Magpie," as the species is generally called, though it is not a magpie at all, but one of the Shrike family, a common bird everywhere, its black and white plumage suggesting the magpie to English-bred men. Curiously enough, too, the Australian bird carries with it some of the old world folklore connected with the magpie and other members of the Corvidæ—i.e. bad luck attending the person who sees a single individual, but extraordinarily good luck to see two or more together. Brooches are sold on which two of these birds are depicted, and these lucky trinkets are sold throughout the country. The clear and loud piping call of this bird can never be forgotten and never imitated by man. Alfred Russell Wallace calls it a "wonderfully modulated whistle . . . unequalled among European birds" and Gould says "to describe the note of this bird is beyond the power of my pen."

As we left Port Darwin there were many brownish Kites (*Milvus migrans*) with black primaries and forked tails, sailing over the harbor. The next call was at Thursday Island in Torres Straits (our nearest point to New Guinea) where many beautiful Silver Gulls (*Larus novae-hollandiae*) with black bars on the white wing-tips and blood-red beak, legs and feet, hovered screaming around the ship as she made landing. Further down the coast we saw crested Terns (*Sterna bergii*) and in the lower reach of the Brisbane River a flock of the Australian Pelican (*Pelecanus conspicillatus*) was sitting on a low island. Off the coast of New South Wales the Australian Gannet (*Sula serrator*) was likewise seen, and following the ship day after day into southern latitudes were numerous pelagic species—the Giant Petrel, "Mother Carey's Goose" or "Nelly" (*Macronectes giganteus*) was always conspicuous, but far more numerous were the "mollymawks" or Black-browed Albatross (*Diomedea melanophrys*). Several times we saw in the offing the Great Wandering Albatross (*D. exulans*), and once the Yellow-nosed Albatross (*D. chlororhynchus*) off Port Jackson (Sydney Harbor). Some cormorants or shags (*Phalacrocorax*) were seen once in Moreton Bay, but the species not certainly determined (either

P. fuscescens or *P. varius*). The Great Skua (*Catharacta skua*) was observed once or twice off the coast of New South Wales.

The Zoological Garden at Sydney is one of the finest in the world for situation, across the harbor on a steep slope overlooking the city and the upper bay, and the collection of animals and their arrangement are admirable. There was one large flight cage devoted to the great variety of native parrots, parroquets and cockatoos, and another smaller cage to a collection of different kinds of the lesser indigenous birds. Here in these gardens I saw wild the Australian Brown Flycatcher (*Microeca fascinans*) generally called the "jacky winter," and once in the Botanic Gardens a male of the beautiful Blue Wren (*Malurus cyaneus*); also the Black and White Fantail or "willie wagtail" (*Rhipidura leucophrys*).

This is only a small part of the wonderful Australian bird fauna, but it was something to have seen even this much—to have seen birds one has known for so long in books, by name and picture, alive and in their native haunts with the atmosphere of Australia all about them. The English colonist has everywhere throughout the world introduced his own English home birds and Australia is no exception. The Greenfinch, the Goldfinch, and the familiar House Sparrow, are common in the settled districts, and so is that famous songster the Skylark.

One evening in the twilit woods of the New Zealand geyser region I heard a clear bell-like bird call, one that I knew I had heard before in a zoological garden at home. It was strangely beautiful and I asked our Maori guide if that was the 'Tui.' "Yes," he answered, "that's the Tui." Up in the deep, leafage I did not see the bird, but its loud, clear notes came down to us in the dark ravine. I recalled the bird with its glossy plumage—black with green and blue reflections and the two white curling tufts of feathers hanging from its throat, reminding one of a cleric's bands, whence the English call it the 'Parson-Bird.' It belongs to the family of the Honey-Eaters (*Meliphagidae*) and it is known to ornithology as *Prosthemadera novae-zealandiae*. 'Poy' or 'Poe-bird' is another name, for its white throat tufts reminded Captain Cook's crew of the 'Poies' or ear-rings worn by the Tahitians. It is said to be a good mimic and is a favorite cage bird. The song we heard that evening was of aboriginal New Zealand. A few days later, in

the crisp morning air of a New Zealand spring (mid-August) there came to us from high up in the trees of a town garden the unmistakably familiar and yet strangely out-of-place notes of a species from far beyond the sea—the Throstle or Song Thrush of Old England. Both it and the English Blackbird (*Merula*) had been introduced and were thoroughly at home in this strange land of the "Tui." It was a call to the old world of romance—these songs of the merle and the mavis—and so we set our faces once more toward the Golden Gate and home.

THE LAND OF SAGEBRUSH AND JUNIPER

AN ACCOUNT OF PART OF THE WORK OF THE NEVADA-ARIZONA EXPEDITION OF 1924

BY JAMES A. G. REHN

In the Annual Report of the Academy for the year 1921, there was presented an outline of the field work which has been carried on systematically for a number of years in the western and southern United States by Mr. Morgan Hebard and the writer, the purpose of which has been to secure material and information for a monographic study of the Orthoptera of the United States. It should be explained that the order Orthoptera comprises those insects commonly called cockroaches, mantids, phasmids or walking-stick insects, short-horned grasshoppers, katydids or long-horned grasshoppers and crickets.

For the summer season of 1924 we had planned as a part of this project a reconnaissance of certain sections of southern Arizona, supplementing work done by us in 1907, 1910, 1916 and 1922. Combined with this we had planned to carry out an examination of an extensive portion of central Nevada, from which absolutely no information in our particular field of study was available.

The work planned and fully carried out in Arizona, while exceedingly interesting, important to our studies and valuable to the Academy, did not hold as keen an interest as that in the sagebrush and juniper land of central Nevada. While the Nevadan fauna is far poorer in species than that of Arizona, the problems with which

it is involved are numerous and have to do with the animal life of the entire Great Basin region. The extent to which the great Pleistocene lakes of that region influenced the present distribution of the biota is a matter requiring careful consideration in any comprehensive faunistic studies of our West.

In previous years we had done considerable field work in portions of Nevada, and also in those sections of California adjacent to the Nevadan boundary line, but there is a considerable section of the famous silver state which has seldom been visited by field zoologists. The basins and mountain ranges of the center of Nevada east of Tonopah we had not examined, and as far as I am aware no other entomologists have carried on any connected studies in this relatively little known and infrequently visited region, most of which is far from railroad lines, with few settlements and nearly as infrequent inhabitants. An absolute lack of information from this lonely land impelled us to select it for a reconnaissance in 1924.

Briefly stated our plan in the Nevadan work was to determine the northward extent of the vast Amargosan-Mohavan desert element, study the southward extension of a northern or mountain complex which is marked in northern Nevada, and ascertain whether and to what extent certain forms of the higher mountains to the southward and of the Arizona plateau intruded into this region.

The funds for the season's work were most generously supplied by Mr. Hebard and his father Mr. Charles S. Hebard.

Leaving Philadelphia on August sixteenth, we reached Salt Lake City, Utah, several days later, and made a short side trip into the higher Wasatch Mountains to compare conditions in their Canadian and Hudsonian zones with those of similar areas in the main Rockies. From Brighton, at the head of Big Cottonwood Canyon (8728 feet) we examined the fir-clad slopes and alpine meadow areas extending up to the slide rock of Mt. Tuscarora and Pioneer Peak, at somewhat over ten thousand feet elevation. The alpine chipmunks and ground squirrels as well as the whistling marmots were all about, the work of the porcupine and his tracks much in evidence; the rosy finches, the Townsend's solitaire, kinglets and the rufous-backed juncos attested the alpine character of the bird life. It was very cool during our stay and the morning we left snow was falling, while the peaks about and our hunting

grounds between them were mantled with white. At seven thousand feet, at the lower edge of the aspen, we had the good fortune to secure a little-known grasshopper, regarding which no exact habitat notes were previously available, although the species was described nearly thirty years ago.

The morning of August twenty-second found us at Tonopah, Nevada, and we were happy to know the plans and arrangements we had made in advance were considered fully practicable, and in the early afternoon of the same day we were under way, fully equipped for a stay of nearly three weeks and a journey of about seven hundred miles over Nevada's roads, good, bad and indifferent. Our driver was an ideal companion, one of long acquaintance with the country, with the necessary knowledge and experience for efficient automobile handling under the conditions to be met. Our transport was a light truck with extra gearing, which gave lower speed but proportionately far greater traction.

To the west of Tonopah and at the foot of a long slope lies a broad flat, from which to the northward stretches the Big Smoky Valley, which is big in more than name. South of this flat is the craggy group of Lone Mountain, again south and southwest of which is the much more extensive Silver Peak Range. Sheltered in the curve of the east side of the Silver Peak Range is a relatively low valley (4350 feet), known as Clayton Valley, in which is an extensive salt flat, with small areas of saline ponds, salt grass, and tules. This valley was our first objective. Here we made camp among adobe dunes a few miles from the nearly deserted mining community of Silver Peak. As expected we here found marked evidence in the Orthoptera of the Amargosan-Mohavan influence, while the salt grass areas were frequented by a very local and little-known grasshopper partial to these conditions, even in the depths of Death Valley. Our gasolene pressure lantern, which we used every night in camp, attracted the interesting desert cockroaches and mantids, while moths, beetles and ant-lions sought its light and later enriched the Academy's collections.

From Clayton Valley we turned eastward toward Goldfield, passing Alkali Spring with its crusted alkali, tules and salt grass, and but a short distance east of this place, at about 5200 feet elevation, we passed the first tree yuccas or joshua trees, which are

there at virtually the northern limit of their range. This remarkable plant is strikingly developed at certain elevations on the mountains encircling the Mohave Desert, and is also a marked feature of the landscape of the Charleston Mountains of southern Nevada, where it is similarly limited to a well-marked belt. Passing through Goldfield, which through the turn of fortune and the blight of fire, is but a shadow of the prosperous town of a few short years ago, we left communities behind for some days.

In the Goldfield Hills we did night work with flash lamps in the tree yuccas for certain rare and little-known arboreal katydids, among them being the genus *Aglaothorax*, but though they frequent these trees in the Charleston Mountains we did not find them in similar situations elsewhere in Nevada. We did, however, take this genus in junipers at a number of localities from the Belted Range eastward.

Crossing Stonewall Flat, one of the many closed basins so characteristic of the Basin and Range Province of the modern geographer—the "Great Basin" of the older physiographers—we reached the Cactus Range, a rhyolitic mountain ridge that to the southward joins the broad bench of Pahute Mesa, which latter occupies some hundreds of square miles of nearly waterless land surface. From Cactus Spring in the Cactus Range we looked eastward over the broad extent of Cactus Flat and to the southward Gold Flat, each with one or more dry mud sinks, to the long Kawich Range, twenty-five or more miles away.

The mud sink of Cactus Flat (about 5400 feet) is not as low as that of Stonewall Flat (4705 feet) but is more extensive, being over three miles across. Across Cactus Flat, and the northern end of Gold Flat, through some low hills separating the two, our route led us to the long barrier of the Kawich Range.

Our camp in the Kawich Range was in the shadow of low craggy peaks at 7100 feet near an old well of poor water, known as Granite Well, which contained numerous dead pack rats (*Neotoma*). Here, though no junipers or pinyons were present, a distinct northern influence was evident in the grasshopper life, as well as a representation of those Great Basin species which prefer craggy slopes and bare rock. The joshuas had been left behind and we did not see them again on our route.

The Kawich Range is much narrower at Granite Well than it is a score of miles to the northward, and from the top of a nearby crag reaching 7500 feet we had a wonderful view to the Cactus Range and far beyond on the west, over Kawich Valley to the Belted Range on the east and the Reveille Range to the northeast. But a few miles south of Granite Well, on the east side of the mountains, we passed through the deserted gold camp of Kawich, which also as late as 1905 was a post office and boasted the name of Gold Reed. Kawich Valley is not as broad as Gold Flat and its sink is at about 5300 feet, but it particularly interested us as there we found again indications in the grasshoppers of the southern Amargosan-Mohavan influence.

The Belted Range lying to the east of Kawich Valley receives its name from the variegated bands of red, purple, gray, and brown of its rhyolitic rocks. Much of the surface of these mountains above 6500 feet bears scattered but numerous areas of juniper and pinyon, while in the very attractive and picturesque Indian Spring Canyon, under the shadow of Wheelbarrow Peak (8600 feet), we were surprised to find a tree rarity in this region—oak scrub.

We endeavored to cross the Belted Range by way of Indian Spring Canyon, but found this was not possible for a truck, necessitating a return to Kawich Valley and the encircling of Belted Peak at the northern end of the range. Indian Spring, however, furnished our tanks with excellent water, the first in some days.

Our camp at 6800 feet near the west base of Belted Peak (8340 feet) gave us an excellent view of that remarkably colored landmark, the dull maroon slopes of which are streaked with whitish and dotted with the dull green of juniper and pinyon. With a heavy ground cover of sage all about us the juniper and pinyon dotted the country in a park-like fashion, while the shallow canyons through which we climbed to our camp site were gay with clumps of the yellow-flowered composites, known collectively as "rabbit brush"in most of the West.

Night work about camp with the aid of flash lamps and accompanied by much tree climbing was very successful, in that it extended the range of two genera and furnished most valuable data upon two others.

East of the Belted Range a broad valley extends many miles to

UPPER.—Looking down (West) Indian Spring Canyon, Belted Range. Kawich Range in Distance, with Mud Flat of Kawich Valley below.
LOWER.—Belted Peak, Belted Range, from West. Juniper and Sage Cover.

the east and northeast, the far portion of which is known as the Sand Springs Valley. Southward, parallel to the Belted Range and between it and the Timpahute Range, which is dominated to the southward by the great rounded dome of Timpahute Peak, is a narrower valley, rising to the neighborhood of some hills at White Blotch Spring, then gradually dipping to the southward.

Our route had been planned to traverse the more southerly valley, doubling about Mt. Timpahute, but after an examination of this basin we turned to the northeast, and continued in that direction, in order to reach high mountains of the character we wished to examine. We had no reason to regret the change in plan, as by doing so we were led to study the most interesting Quinn Canyon Range.

On leaving our camp near Belted Peak we entered a stretch of country which has been correctly mapped only in restricted areas, and the details of the mountain ranges, their general direction and often their very presence, is not in agreement on the various, very sketchy general charts published, while roads as plotted are often impossible to travel from disuse or are even non-existent.

Our excursion into the valley to the south of White Blotch Spring proved to be exceedingly interesting, as there in the low plant cover of the dull gray, desert basin, we found in the grasshoppers and katydids the most pronounced indication of the more southern Amargosan-Mohavan life element we had encountered since leaving Clayton Valley. In fact the similarity of the forms taken there to those secured some years before in the Vegas Valley, eighty miles to the southward and two thousand feet lower, was very marked. Swinging to the northeastward around the northwestern slopes of the Timpahutes, we found the great valley in this direction becoming progressively more barren, although the general elevation remained about 5500 feet. Two cattle wells, miles apart, one with no water and the other with a little vile liquid in its adobe tank, and both with many dead cattle scattered about, gave mute evidence of the plight of Nevada and other western states in the summer of 1924—stark drought. Near the eastern side of the Sand Springs Valley many miles from the Belted Range we found Shadow Ranch, a little oasis of trees, a pumpman, a clean tank, and a well of good water, in a great and dreary stretch of nearly bare baked abode.

Walled on the east by the Worthington or Freiburg Mountains, to the northward the Quinn Canyon Range encloses the eastern portion of the Sand Springs Valley. A pass over rough hills, with deep washes and sage and juniper cover, gives access to the southern end of Garden Valley, east of the Quinn Canyon Range. The latter mountains dominate the landscape, a group of domed peaks, craggy summits, massive benches and towering cliffs, clothed with as heavy a growth of juniper and pinyon as any encountered by us in Nevada. A few of the canyon valleys with permanent water have been taken up by ranchers, but this range and the Grant Range to the north form probably one of the most remote, least known, and most beautiful mountain regions of the Great Basin.

We camped first in junipers along Pine Creek on the eastern slope at about 6500 feet, then made a second camp near Ox Spring on the western sage-covered slope. The junipers at Pine Creek yielded the strange katydid already mentioned as taken at Belted Peak, but in the higher parts of the range examined, about the head of Cherry Creek and at 8400 to 8600 feet, we found several distinctive northern types of grasshoppers, representing the life element found on the mountain slopes of northern Nevada, Oregon and Idaho.

Cherry Creek Canyon on the eastern side of the Quinn Canyon Range is most attractive, being bordered by towering walls and weird spires of red rock, well clothed with juniper and pinyon, and boasts of a constant stream of clear, cold water, which has been stocked with eastern brook trout. Rattlesnakes were quite numerous in this canyon and several were secured, while no others were encountered during the remainder of our Nevada work of the year. Many Gambel's quail and the friendly Say's phoebe were old friends found near Cherry Creek, while at Ox Spring in the early morning the pinyon jays passed over our camp in straggly flocks.

From the road summit on the range the view to the westward was superb, down the long western slopes, across Railroad Valley to the far distant Pancake Range. To the northeast appeared peak after peak of the high Grant Range, which topographically is virtually a continuation of the Quinn Canyon group.

Railroad Valley is broad and relatively level, with the high Quinn Canyon-Grant chain bounding it on the east. Some good springs

UPPER.—Cherry Creek Canyon, Quinn Canyon Range. Sage and Juniper Cover.

LOWER.—Monte Cristo Range, from South, looking across Flat North of Lone Mountain.

occur along its eastern border and the occasional meadowy areas and many grassy stretches have caused a few ranchers to settle near them. Some areas of alkali-caked soil greatly interested us, as the halophilous tendencies of certain grasshoppers of the desert and semi-desert flats cause us to examine these otherwise undesirable places with particular care, and at Butterfield Springs and Blue Eagle Springs we found the forms we were seeking.

Leaving Railroad Valley our next base was near Currant Summit in the Horse Range, which is a relatively low ridge connecting the Grant Range and the White Pine Range. Here at an elevation of 7300 to 7900 feet in pinyon and juniper, with many mountain mahogany trees scattered through the main stand, we found a marked mixture of northern Orthoptera types with others of the more usual Nevadan mountain element, also an evident touch of the forms of the Colorado Plateau of Arizona, which tendency, as far as our own field is concerned, had never been noted north of extreme southern Nevada.

In the Egan Range to the south of the modern copper mining town of Ely, we found at elevations of 7800 to 8000 feet, pronounced evidence of the northern life influence, which was to be expected as our course for a hundred miles had been generally northward and many relatively high areas had been examined.

Leaving Ely, with certain supplies replenished, we travelled south up the Steptoe Valley, which here has the Egan Range on the west and the Shell Creek Range on the east, then turning eastward climbed a pass in the Shell Creek Range, camping at 8100 feet on the east slope near the pass. Here and at the summit of the pass (8350 feet) we found much the same faunistic tendencies in the grasshoppers as noted at similar elevations in the Egan Range to the west, but in addition we secured a most striking, previously unknown type of a widely distributed western genus. Looking to the east from the slopes about this camp the view swept across Spring Valley to the towering Snake Range, the highest peak of which, Mt. Wheeler (named for the head of the famous Wheeler Survey) is 12,063 feet above sea-level, the highest mountain in Nevada. Mt. Wheeler is a very rugged peak when seen from certain angles; from due north the summit is seen to be sharp and craggy, sheer on the western side, from the east it is seen to have

on this side a marked cirque streaked with great snow patches as late as August 30.

In the Snake Range, which we crossed twice by different routes, i.e. Sacramento Pass when eastbound, Osceola Pass returning, we found the northern life element well indicated. The most eastern point reached by us in our Nevada work was the little settlement of Baker in the Snake Valley, east of the Snake Range and but a few miles from the Utah line. Here at 5850 feet we found valley types, and the cultivation of parts of the valley was reflected in a marked abundance of native species of grasshoppers which are injurious to crops, but which under conditions of undisturbed nature are usually much less numerous.

Descending the west side of the Snake Range from Osceola Pass, over a dangerously steep grade, we passed through the deserted mining camp of Osceola, from near which to the southward Mt. Wheeler is a most commanding figure.

Returning to Ely our general route thence was westward to Austin, then due south to Tonopah, mainly through country rich in mining history, but which was unknown as far as our special interest was concerned. The general direction of the mountain ranges here, as elsewhere in north and central Nevada, is roughly north and south, so east and west travel requires the traversing of a succession of usually low ranges and broad valleys. Our general course westward ranged from one hundred to one hundred and fifty miles to the north of the greater portion of our eastward route to Ely, and in consequence, the more northern forms of Orthoptera were regularly in evidence, although less diversity of elevation and of surface and vegetational conditions was here encountered.

On Pogonip Ridge, 7200 to 7600 feet, we found the last indication of the previously mentioned Coconino Plateau influence. There is a particular interest to us in this coincidence, as Pogonip Ridge is orographically the northern part of the Quinn Canyon—Grant—Horse—White Pine uplift. No marked indication of this influence was noticed in the Egan, Shell Creek, or Snake Ranges east of the broad trough of White River and Jakes Valleys.

Some of the ranges between Ely and Eureka, as on Pogonip Ridge and at Pancake Summit and Pinto Summit, had their boreal tinge sufficiently marked for them to be inhabited by a species of

UPPER.—Quinn Canyon Range, looking Northwest from Road Pass. Elevation over 8000 feet.

LOWER.—Toyabe Range from Floor of Big Smoky Valley, looking Southwest.

crackling grasshopper of the genus *Circotettix*. These insects perform aerial dances for a considerable period of time, accompanying these with a crackling or snapping noise, made by the friction of certain thickened wing-veins over one another. Other crackling species represent different genera and are less boreal in character, but the species of true *Circotettix* are northern types and are the crackling air-dancers par excellence.

Eureka, one of that galaxy of mining towns which made the name of Nevada famous in the latter half of the past century, today is but a shadow of its former self. Near Devil's Gate, a rocky defile west of Eureka, we flushed from a meadowy spot near a lone ranch house five of that most beautiful of waders, the black necked stilt, while the increasing number of magpies attested to the fact that we were in northern Nevada. About twenty miles east of Austin the northern section of the Toquima Range was crossed. Here this uplift is rather low, but stretching southward a hundred miles or more it has in that direction many high peaks, looking down upon the broad Big Smoky Valley on the west, which reaches southward like a great avenue, between the Toquimas and the higher Toyabe Range.

Crossing the Big Smoky Valley we visited higher levels in the Toyabe Range, and worked in lush meadows with running streams, a great rarity in most of Nevada. Meadow types of grasshoppers of the northern element were here at 7400 feet. The slopes at this elevation and above and below it were quite solidly in juniper and pinyon, except where mining demands had cleared them. Passing through Austin, a worthy sister of Eureka, we made a short side trip into the Reese River Valley to the west of the Toyabe Range, then returned across the range to the broad Big Smoky Valley, down which we were to work toward Tonopah. The Big Smoky Valley like most of those we had examined for a long distance to the eastward, is of north and south disposition, but it averages somewhat lower, and in consequence an examination of about one hundred and thirty miles of its length was of particular interest to us. In this way it would be possible to trace the northern extent of southern types found on the broad flats west of Tonopah and also the southward penetration of the valley by forms of the more northern life element.

We soon found that southern forms extended northward in the valley for about one hundred miles north of Tonopah. The more southern shrubs *Sarcobatus* and *Grayia* soon became evident, mixed with the ever-present sage of the more northern valleys and slopes, while near the numerous small creeks coming down from the high Toyabe Mountains to the west, were great areas of yellow flowered composites.

Near the center of its length Big Smoky Valley has several sinks, one in an alkali flat a number of miles across. At Darrough's Hot Springs (5600 feet) is much bare alkali-encrusted soil as well as patches of salt grass, each of which environments was frequented by a species of grasshopper partial to such conditions. Neither species had been taken by us at any point within scores of miles of this locality.

The whole Toyabe Range is most impressive, and of its elevations Arc Dome towers above the peaks and crags of the more eastern escarpment of the chain, a rounded summit, well named, which reaches nearly 11,800 feet above sea-level, or 6000 feet above the western edge of Big Smoky Valley at this point. A number of other peaks in the range reach 11,000 feet or more.

Our last day in the main Big Smoky Valley held one of the surprises of a dry summer, a steady cold rain for the great part of the day, cheering to the rancher, but less pleasing to those working with a camp outfit.

The broad flat from fifteen to thirty miles west of Tonopah occupied our time for several days. Here in 1922 we had secured one of the rarest genera of katydids known in America and we were anxious to know more about it, but fortune did not favor us again. However, we were amply repaid for our work by securing the first definite habitat information on, and material of, a desert grasshopper previously known only from a single specimen, taken to the westward in another Nevadan desert flat. We had searched for it in 1919 at the original locality, without success, but here when engaged in looking for something we had previously secured, we located what was to us an even more remarkable find. Such a surprise makes a red letter day in the work of the field zoologist.

An extensive area of sand and clay dunes topped with *Sarcobatus* bushes, near the northwest foot of Lone Mountain was also exam-

ined, and a last camp then made at 6800 feet in Springdale Canyon on the east side of that mountain group, among the junipers.

On September 8 we left Tonopah for the Arizona part of our season's work, stopping on the way for the examination of a Mohavan environment which had interested us for some years past. The sand areas in California west of Yuma, Arizona, and the slopes and vicinity of the Gila Mountains east of Yuma, were also given attention before reaching Tucson, the base for the remainder of the season's work.

Leaving Tucson on September 13 we travelled six hundred miles by automobile through southern Arizona, securing most interesting collections and notes, verifying and checking observations made in previous years, and investigating specific problems which had been raised by prior studies—both our own and those of other students. However, it seemed to us that the reader would be more interested in a more detailed account of the out-of-the-way Nevadan country traversed and examined, than with a condensed and abbreviated summary of the whole summer's work. Perhaps it may be expedient sometime in the future to tell about the work done on the Arizona section of the Nevada-Arizona Expedition of 1924, and with this possibility we will leave it.

In the early morn of September 29 we left Tucson and reached Philadelphia, October 2. Our results in material alone were of great value, as will be evident when the collections have been fully studied, but the greatest value of the work done was in the vast amount of detailed observations on environmental associations and behavior recorded for future work, as well as the data bearing upon the distribution and faunistic affinities of the species secured.

Our thanks are most cordially given to Dr. Forrest Shreve of the Desert Laboratory for his whole-hearted assistance and co-operation at Tucson, and to the officers of the Tonopah Mining Company, whose kind intercession enabled us to have the proper man and outfit for our Nevadan work. Mr. Perry White, our Nevadan companion, was one whose ability, good humor, and desire to help in every way, made him one of those rarities known as an ideal camp man.

A GLIMPSE OF QUEENSLAND AND THE GREAT BARRIER REEF OF AUSTRALIA

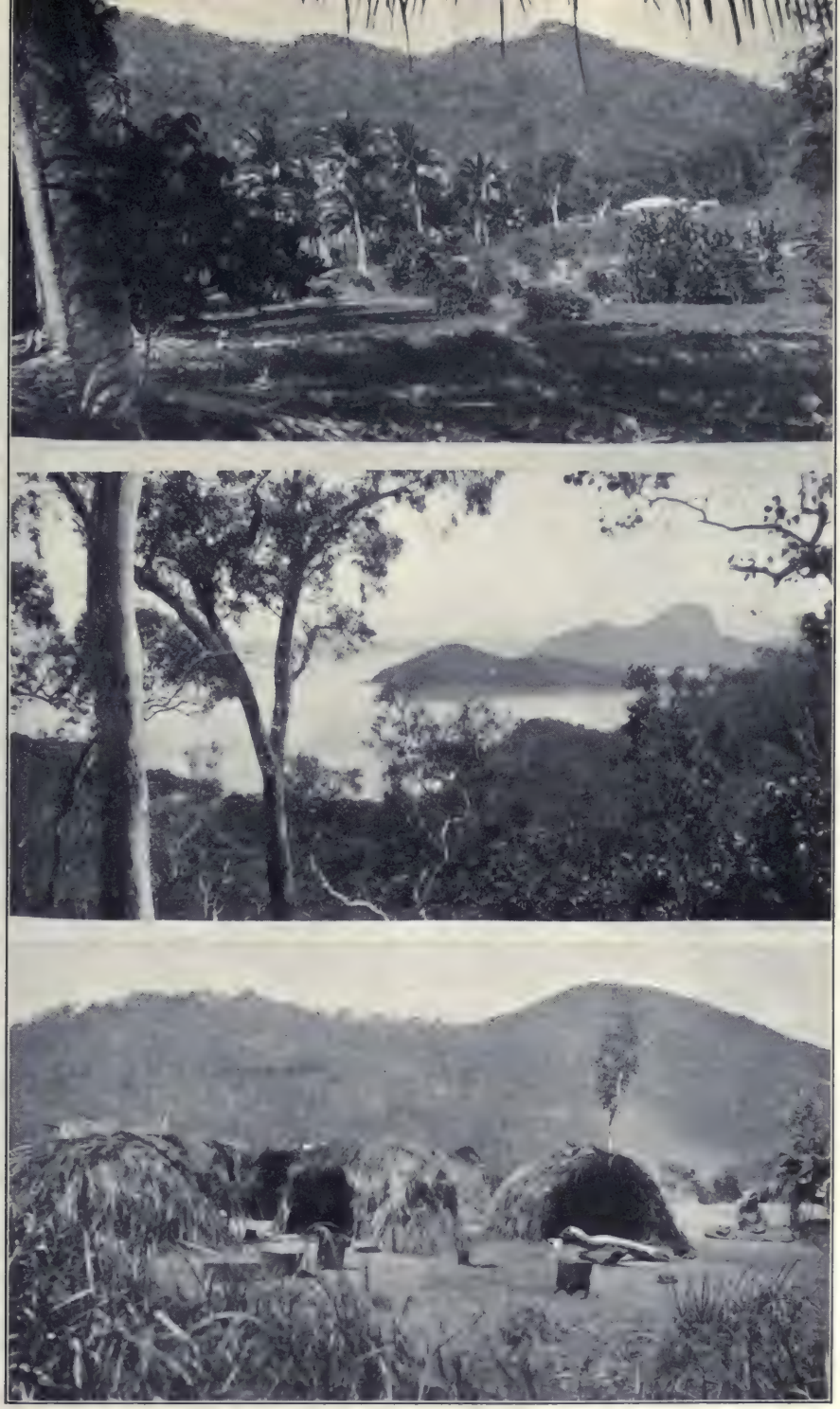
BY HENRY A. PILSBRY

There are a few scenes never forgotten, which repay one for the trouble of a journey half round the world. The Grand Canyon at sunrise from a camp still in darkness by the inner gorge; the crater of Kilauea by night; the faultless cone of Haleakalá emerging through a sea of clouds, viewed from the summit of a neighboring island. Each of us has his own gallery of such pictures, lovely or grand, for entertainment in a sometimes perplexing world. One of the jewels of my gallery is the splendid panorama of wooded islands strewn in a turquoise sea, seen from the summit of Lindeman Island off the Queensland coast.

At the close of the sessions of the Second Pan-Pacific Scientific Conference held at Melbourne and Sydney in 1923, it was my good fortune to be one of the party of about twenty naturalists invited to visit the Great Barrier Reef as guests of the Government of Queensland.

I left Sydney September 3 on the Northern Line, in advance of my fellow delegates. September in Australia stands for March with us; but there was none of the bleakness of our early spring. The wattles[1] had been in gorgeous bloom for some weeks. Most of the trees and shrubs are evergreen, like our southern live oaks, but herbaceous annuals were only appearing. Before dark I had a rapid view of the lovely Hawkesbury River, a narrow winding inlet of salt water, the drowned canyon of a river. The railroad then passes through rich dairy and fruit country and on up to the Queensland boundary at Wallangarra. Here at the crest of the McPherson Range, 2876 feet above the sea, the morning is almost frosty. Going on into Queensland, the Darling Downs recall the finest farm lands of our Middle West. There is some interesting country eastward, at the rather abrupt descent to the lower levels. Along here, as in many parts of New South Wales, the steeply conic earthen mounds of termites, usually two or three feet high,

[1] Acacias, abundant and of many kinds, are called "wattles" in Australia—a new and beautiful incarnation of an almost obsolete word.



UPPER.—Dunk Island, North Queensland. Roof of Banfield's Dwelling in Middle Distance.

CENTER.—View from Lindeman Island, Lion Island in the Distance on Right.

LOWER.—Native Domiciles, Challenger Bay, Palm Island.

are a feature of the open woodlands and pastures, often by hundreds.

From the car window some of the finest blue gums are seen. Standing in ample paddocks[2] these noble trees bring to mind the American elms of New England. Not that there is any close likeness, but each gives the sense of absolute perfection. They have a spiritual quality which I hardly know how to express. Such trees it must have been which inspired the idea of dryads. Before night we are in Brisbane, capital and chief city of Queensland.

Wishing to see something of the subtropical forest, I went from here to Tambourine Mountain. The name suggests musical comedy, but it is said to be from an aboriginal dialect. There is still some untouched scrub here, though fast vanishing before the lumberman's axe and ten-ox team. The Australian term "scrub" seems inadequate, applied as it is to these magnificent forests. Huge, column-like trunks, smooth or buttressed, shut out the sun with their dense canopy borne several hundred feet aloft. They give lodgment to a multitude of epiphytes, tree ferns of gigantic size and strange antler-like shapes, orchids, and climbing plants.

The eucalypt woodlands of temperate Australia are park-like, open and almost sunny below the misty sprays of gray-green foliage; but in these Indo-Malayan forests the undergrowth is almost impenetrable. The trees are often full-rigged like a ship with climbers. If one's spirit is uplifted by the stillness, beauty and infinite variety of the jungle, the flesh is certainly afflicted in the attempt to penetrate it. A climbing bamboo, thin but strong as wire, and set with recurved thorns, picks off my cap. In retrieving it the slender tentacle from a leafy spray fastens its hooks in my cheek and hair. But the huge Queensland snails, *Thersites*, *Panda* and others are to be found here; I have to push on. A bite on the neck like a red-hot needle reminds me of the warning not to brush up against bushes where the big green ant makes his airy nest.

In the deep scrub, birds do not seem very abundant. From above the cries of parrots now and then break the extraordinary silence.

A week later, the Barrier Reef party having assembled, we entrain on the Northern Coast Line, reaching the port of Mackay in

[2] In Australia this term is applied to a pasture or grazing range.

S. lat. 21° 8′ in about thirty hours. An interesting sight of the journey was a grove of bottle trees, huge misshapen vegetables with swollen trunks, like the baobab tree of Africa, and I am told, related to it.

At Mackay the Queensland Government steamer "Relief" was awaiting us. Our host was H. E. Sir Matthew Nathan, Governor of Queensland, who is also Chairman of the Barrier Reef Committee. This is a body of representatives of the scientific institutions of Australia organized for the purpose of investigating both scientific problems and economic resources of the Reef. H. C. Richards, Professor of Geology in the University of Brisbane, Secretary of the Committee, was our guide. Charles Hedley of the Australian Museum was the friend and companion of the zoologists. Even his knowledge of the reefs and reef animals must have been taxed by our questions, but his learning, patience and good nature seemed equal to the strain.

The "Relief," while comfortable and seaworthy is not a large steamer. When our mattresses were spread for the night you might walk the length of the deck on sleeping scientists. In the morning, with twenty men trying to shave, the competition for mirrors was keen. I suppose no more congenial party was ever assembled from the ends of the earth.

The Barrier lies sixty miles or more off shore near its southern end, drawing in northward. Within the outer reef is a labyrinth of reefs and low islets, largely uncharted, then a wide channel provided with beacons, and towards the coast an irregular series of high islands of granitic or other continental rock, believed to be the peaks of a drowned coast range, and giving important evidence of coastal depression. Many of these high islands have fringing reefs.

Steaming up the coast in the wide ship channel, we had our first view of a living coral reef at Great Palm Island. Usually one can walk a long way out on these fringing reefs at low tide, the living coral never more than a few inches above low water level, though debris and blocks of coral—"nigger heads"—are often torn by hurricanes from the edge and thrown high on the windward side of the reef. Everywhere shallow pools swarm with life—sea urchins, crabs, mollusks. In the holes lurk octopi and handsomely

UPPER.—Living Coral in the Lagoon on Young Reef (Photo. by H. C. Richards).
CENTER.—Inshore Part of Fringing Reef, Orpheus Island.
LOWER.—Corroboree of Australian Blackfellows, Palm Island, North Queensland.

variegated but dangerous eels. Giant clams, sometimes far heavier than a man can lift, lie gaping open in the pools. Their broad mantles are wonderfully brilliant, blue, green, or purple with green spots, and set with eyes. They are ready to snap shut if liberties are attempted. I have counted as many as fifteen of these huge bivalves in a radius of twenty-five feet.

Many bivalves and annelids nestle in holes in the coral, and are found only on breaking it up. Under a loose block of coral you may find a dozen pretty cowries, or a cone shell ready to use its poison fangs. Chitons are very scarce, but the shore rocks are often closely set with limpets.

Some of the reefs visited, such as Pandora, are piled ten feet high with coral and shell debris, leaving little living coral. Hedley and Taylor have shown that the crescentic or atoll-like form of isolated reefs such as this bank are determined by the prevalent direction of hurricanes.

The gardens of living coral are at the edge of the reef. A smooth sea and the water glass allow a glimpse into the coral world. Here a huge table of purple porites rises nearly to the surface. Next to it is a tangle of madrepores, yellow with pink tips, and beyond that a mound of massive, green meandrinas.

The fishes inhabiting the coral glades are, if possible, more brilliant than their background. Only the purest primary colors seem to be worn; and as though to make them the more conspicuous, many are barred with contrasting hues. Whether these brilliant patterns are "warning" remains to be determined. If so, the fish eaters must needs have good memories, so numerous and varied are the patterns.

After a session on the reef we would go aboard wet and hungry but happy; those of us with the collecting instinct loaded with "specimens." But after all, to really learn much about the animals of the reef one should settle down for a year with microscope and sketch book on one of these charming islands. All we had time to assimilate was a general impression.

The Palm Islands are a reserve for Australian aborigines. On our second call there, they gave a "corroboree" in honor of H. E. the Governor. The costumes, different for each group or tribe, are chiefly red ochre and the white down of water fowl stuck on

with dried blood. The dance was mainly a matter of posturing and stamping, time being kept by striking boomerangs together, the women sitting on the side lines striking their thighs with the palm. One dance was a capital pantomime of emu or cassowary hunting, the long neck and head of the birds represented by an arm and hand held aloft. Probably all of them are allegoric or symbolic. The backs of the performers were not decorated, and when the dancers turned to retire the effect of plain black backs was most ludicrous.

Some of the more pretentious native houses look like rather poor imitations of the Polynesian grass house. Other family dwellings are low untidy grass-thatched shelters such as are shown in the photograph, housekeeping being carried on outside.

Unfortunately, the women and children were camera-shy, and scuttled out of sight before I could get the lens into action. Perhaps they did not have on new dresses of palm oil.

One of our last anchorages after turning homeward was at Dunk Island, where E. J. Banfield wrote his "Confessions of a Beachcomber" and "My Tropic Isle"—books which delight all who have a passion for tropical nature. Banfield died about three months before our call. His lovely island has been made a bird sanctuary.

Returning to Brisbane the party disbanded, with many regrets at parting with good friends and royal hosts. A few days later at Sydney we bade good-bye to beautiful, hospitable Australia.

Report of the Librarian

During 1924, the accessions to the library total 8173, an increase of 1190; of these 7315 are pamphlets and parts of periodicals, 710 volumes, 147 maps, and one autograph letter (photostat). This increase is all the more gratifying since the funds for the purchase of books were available for continuations only during the last four months of the year.

They came from the following:

Exchange	3976
Isaiah V. Williamson Fund	2545
United States Department of Agriculture	561
General Appropriation for Purchase of Books	216
J. Aitkin Meigs Fund	108
Authors	88
Editors	60
New York Agricultural Experiment Station	42
Pennsylvania State Library	39
W. W. Forstall	37
Mrs. T. B. Dallas	32
Thomas B. Wilson Fund	23
State of New Jersey Department of Agriculture	22
Government of India	22
William J. Fox	21
Dr. Thomas S. Stewart	21
Trustees of the British Museum	21
Publication Committee, Academy	20
United States Department of Commerce	19
Utah Agricultural Experiment Station	14
R. C. Williams, Jr.	14
National Association of Marble Dealers	13
Biological Board of Canada	12
American Entomological Society	11
Cornell University Agricultural Experiment Station	11
Samuel G. Gordon	11
Australian National Research Council	10
Department of Archives and History, Alabama	10
Mississippi State Geological Survey	10
Union of South Africa Fisheries and Marine Biological Survey	9
Kentucky Geological Survey	8
Museum of the American Indian, Heye Foundation	8
Pennsylvania Museum and School of Industrial Art	8

Colorado Historical and Natural History Society	7
Pennsylvania Forestry Association	7
Vermont Agricultural Experiment Station	7
Henry W. Fowler	6
California Fish and Game Commission	5
South Dakota Geological and Natural History Survey	5
State Plant Board of Florida	5
Dr. William L. Abbott	4
Indiana University	4
Maryland Academy of Sciences	4
United States War Department	4
Amgueddfa Genedlaethol Cymru (National Museum of Wales)	3
Ministère des Colonies, Belgium	3
Nigeria. Geological Survey	3
Dr. Witmer Stone	3
Tennessee Department of Education, Division of Geology	3
Carl Hering	2
Charles Hedley	2
Danish Government	2
Secretaria de Agricultura y Fomento, Mexico	2
Comité Spécial de Katanga	2
Philadelphia College of Pharmacy	2
Kent Scientific Museum	2
San Diego Society of Natural History	2
Warren Academy of Sciences	2
Jardin Botanique de l'État, Bruxelles	2
Wild Flower Preservation Society of America	2
Zoological Society of Philadelphia	2
Southwest Museum	2
California. Department of Agriculture	2
Clarence B. Moore	2
Komiteen for Kap York Stationen Thule	2
Professor E. C. Jeffrey	2
Cuerpo de Ingenieros de Minas del Peru	2
Augustana Library	1
Alabama. Geological Survey	1
Association Régionale . . . de Paléontologie Humaine et de Préhistoire	1
John M. Clarke	1
Chosen Natural History Society	1
Charles Sprague Sargent	1
Onandaga Historical Association	1
Santa Barbara Museum of Natural History and Comparative Oology	1
Estate of Philip Nell	1
National Academy of Sciences	1
Dr. McCluney Radcliffe	1
Japan Society	1

Colorado Museum of Natural History	1
Louisiana State Museum	1
New York State Archeological Association	1
Scientific Society of San Antonio	1
Joseph Leidy Commemorative Committee	1
Rockefeller Foundation	1
Republic of Haiti. Department of Public Works	1
Mechanics Institute, San Francisco	1
New South Wales. Fisheries	1
Florida State Geological Survey	1
Thomas L. Montgomery	1
Congress of Russian Zoologists, Anatomists and Histologists	1
Massachusetts. Division of Fisheries and Game	1
Howard University	1
Michigan Geological and Biological Survey	1
Paul J. Fox	1
Imperial Entomologist, Pusa, India	1
City of Portland, Oregon	1
Philippine Commission of Independence	1
National Research Council	1
Kentucky Academy of Sciences	1
United States Pharmacopoeial Convention	1
Acadian Entomological Society	1
Michigan College of Mines	1
Iowa Geological Survey	1
Board of Water Supply of City of New York	1
Dr. Henry Skinner	1
N. Boubée	1
Philadelphia Museums	1
Royal Zoological and Acclimatisation Society of Victoria	1

These were distributed to the various departments of the library as follows:

Journals	5966	Conchology	17
Agriculture	831	Helminthology	10
Geology	597	Ichthyology	9
Botany	193	Physical Sciences	8
General Natural History	151	Mammalogy	7
Voyages and Travels	96	Medicine	7
Geography	84	Chemistry	6
Anthropology	51	Herpetology	4
Anatomy and Physiology	46	Philology	2
Mineralogy	30	Bibliography	1
Ornithology	27	Miscellaneous	7
Entomology	23		

Among the more important additions is a fine copy of A. von Haller, *Historia Stirpium indigenarum Helvetiae inchoata*, 3 vols. (in 2), folio, 1768.

A total of 814 volumes were bound, and four repaired, a decrease made necessary by the transfer of part of the appropriation for binding to the purchase of books.

Twenty-three volumes, and 163 pamphlets were transferred to the Free Library of Philadelphia; these belonged to subjects not within the Academy's interests.

One hundred and sixty volumes and parts of periodicals were borrowed by members; and 1847 were used on the premises by the scientific staff.

The new journals and transactions added by exchange or purchase are as follows:

Abhandlungen zur Naturgeschichte, Chemie, Anatomie, Medicin und Physik, etc., Band I, Brandeburg, 1781.
Academia Romana, Bucuresci. Ananele (Memoriile Sectiunii Scientifice); Discurs de Receptiue; Publicatiunile Fondului Vasile Adamachi.
Académie des Sciences de Russie, Bulletin de l'Institut Physico-mathematique.
Amateur (The), Philadelphia, 1871.
American Forests and Forest Life.
American Geographical Society. Research Series; Special Publications.
Angueddfa Genaedlaethol Cymru (National Museum of Wales). Pamphlet.
Anthropologischer Anzeiger, Stuttgart.
Anzeiger f. Botanik und Zoologie, Leipzig.
Archiv Mecklenburg. Naturforscher, Rostock.
Archivio Italiano di Scienze Mediche Coloniali, Tripoli.
Australian Museum Magazine, Sydney.
Australian Science Abstracts.
Association Française de Botanique. Bulletin.
Association Régionale pour le Developpement des Recherches de Paléontologie Humaine et de Préhistoire. Bulletin.
Ayuntamiento de Barcelona y Mancomunidad de Catalana. Memorias del Museo de Ciencies Naturales de Barcelona.
Boston Mycological Club. Bulletin.
Botaniska Notiser, Lund.
Ceylon Journal of Science, Section B.
Charles University, Prague. Studies from the Plant Physiological Laboratory.
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The thanks and appreciation of the Librarian are extended to Mr. Wm. J. Fox for his efficient work as Assistant Librarian and also to the valuable assistance of Miss H. Newell Wardle.

SPENCER TROTTER,
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Report of the Publication Committee

The PROCEEDINGS for 1924, to be issued shortly will contain 444 pages and 21 plates, and the YEAR BOOK for 1923 containing 96 pages and plates was printed and distributed early in 1924. As usual, reprints of all the papers in the PROCEEDINGS for the year were distributed as soon as received from the printer in order to establish a date of issue.

The American Entomological Society has published 335 pages, and 10 plates of volume 50 of its TRANSACTIONS; and 394 pages and 11 plates of the ENTOMOLOGICAL NEWS.

Part 107 of the MANUAL OF CONCHOLOGY, containing 48 pages and 7 plates, was issued under the editorship of Dr. Henry A. Pilsbry.

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of

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1926

Year Book

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1925

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BOTANICAL TRAVEL IN PERU AND CHILE

BY FRANCIS W. PENNELL

The Andes are the longest mountain system on earth and one of the highest, and to the biologist they offer a peculiarly interesting opportunity for studies of plant and animal distribution. Much of this immense and isolated highland has as yet been unvisited for such work, and still yields a large porportion of species new to science.

In 1917, and again in 1922, I had the pleasure of collecting the plant life of the upper Andean regions on each of the three cordilleras which, in Colombia, terminate the great mountain system. Here I had observed how the flora varies from chain to chain, and differs in each separate chain on both sides of those occasional gaps where the uplands are cut by passes that do not rise above the subtropical forest. To some extent the plant life of the upper northern Andes has developed by the modification of forms native to the subtropical and tropical forests which clothe their lower slopes; to an even greater extent it seems to have reached its present home by following the long pathway which must once have been continuous from southern Chile along the Andean uplands to northern Colombia.

To see the central and southern Andes had therefore become a great desire, especially in following out the study of my chosen family of plants, the Scrophulariaceae, to which in North America the Penstemons, Linarias and wild foxgloves belong. In Colombia I had become familiar with a few species of *Calceolaria*, or slipper flower, belonging to this family and one of the most remarkable of all Andean genera. In Peru and Chile I knew that the species of *Calceolaria* were much more numerous than in the north, totaling well into the hundreds. *Bartsia*, so typical of the bleak Colombian paramos, was to be expected in manifold new forms

in Peru; while southward in Chile grew other genera nearly or wholly unknown to me. Particularly did I wish to see the several genera of Scrophulariaceae which recur elsewhere only in New Zealand, and so seem to give us today a glimpse of the former life of that ancient land connecting parts of the earth now so remote, the Antarctic Continent. *Calceolaria* is such a genus, and so are *Ourisia* and *Hebe*, and a peculiar section of *Euphrasia*.

On December 11th, 1924, Mrs. Pennell and I, accompanied by a niece, Miss Sara M. Pennell, sailed from New York on the Grace Line S. S. "Santa Elisa" bound for Peru. After passing through the Panama Canal and crossing the warm blue ocean that lies west of Colombia and Ecuador we first saw the coast of Peru near its northern extremity at the little oil port of Talara. What a contrast Talara, Peru, less than five degrees south of the equator presents to Buenaventura, Colombia, about an equal distance north of the line! As we had approached the latter port in 1922, the rain was drenching our decks and, encircling the bay, rose a deep green forest that testified to the wettest climate in all the western hemisphere. Talara, on the other hand, was approached in brilliant sunshine and the bare hills rose in brown rounded slopes showing from the ocean scarcely a trace of verdure. We were told that some of the Peruvian and Chilean coast had not had appreciable rain for thirty years. Only where some stream brought water down from the Andes was there a green break in the monotonous stretch of thousands of miles of desert shore.

The reason for the dryness of this long coast is the influence of the antarctic stream known as the "Humboldt Current." Setting northward from the coast of southern Chile this stream of cold water may be felt to the northernmost extremity of Peru. The winds blowing inland from the cool ocean are not sufficiently chilled to precipitate their moisture until they have reached a considerable height on the Andes. Hence the long years of drought on this coast, the building up of deposits of guano on the bird islands off the coast, and the accumulation of nitrates in the Chilean deserts.

Every year, however, there is a slight reversal of the prevailing conditions when a warm current from the north known as "El Nino," "the little one" or "child," sets in, affecting usually but a

slight extent of the northern Peruvian coast, and only for a short duration of time. There is a tradition that once in seven, and especially once in thirty-four years, "El Nino" lasts for a longer time and extends farther south. The last such occurrence was in 1891, when the continued presence of the warm current brought storms and freshets on the shore, and, in the ocean, death to the cold-water creatures and to the birds that subsist on them. Last year again "El Nino" flowed southward, lasting for a length of time beyond precedent and making itself felt as far as central Chile. From mid-January to late March or early April the warm current brought deluging rains that meant disaster to the guano and nitrate interests of the Peruvian and north Chilean littoral, that turned into wet marshland the irrigated fields of Peru, and that washed out all railroads to the Peruvian interior, so bringing to Lima especially serious food and disease problems.[1]

To the botanist, however, this change in climatic conditions brought a unique opportunity to study the ephemeral vegetation that sprang up in the wake of the rains, and to gather plants that may not appear again for many years.

Our first sight of Peru, and all our first acquaintance with its coast, showed the normal desert aspect. We proceeded then directly to Lima so as to attend the Third Pan-American Scientific Congress, to which I had been appointed a delegate from the Academy, and we arrived in that city on December 23rd. The capitol was in full gala attire and there were many intellectual and social functions to which delegates were invited. The Congress had been arranged to follow the "Ayacucho Celebration," the centennial celebration of Peruvian and indeed of Spanish American independence, and many distinguished Latin Americans were still in the city.

The Scientific Congress was notable for bringing together representatives from nearly every country of Spanish America as well as from the United States. At the head of our delegation was Dr.

[1] For a clear account of the Humboldt Current and its influence on life both marine and littoral the reader is referred to R. C. Murphy's "Bird Islands of Peru"; for a vivid account of the effects of "El Nino" in 1925 to an article by the same author in the Geographical Review for January, 1926, entitled "Oceanic and climatic phenomena along the west coast of South America during 1925." Fortunately, Dr. Murphy was in northern Peru during the events he narrates.

Leo S. Rowe, Director of the Pan-American Union, and it is a genuine pleasure to speak of the unfailing skill and interest with which he aided each of us. I attended the biological section where papers were presented on many themes. All discussions and nearly all addresses were in Spanish, and, as the Peruvian enunciation is less distinct and more rapid than the Colombian to which I had been accustomed, it took some time to follow the proceedings readily. I presented to the Congress a paper entitled "A phytogeographic Survey of Colombia," reading an abstract in Spanish and leaving the English text to be issued in the Proceedings of the Congress.

On January 8th we were again sailing southward bound for Valparaiso, Chile. As our plan was to gather the Chilean flora in midsummer, it was most disappointing to learn from some fellow-passengers that we were destined to encounter an unusually dry season in that country. Like southern California, central Chile depends for its vegetation upon the rains of the preceding winter, and, during the winter of 1924, instead of the usual twenty inches, only one inch of rain had fallen, with the consequence that the normal spring flora had not appeared at all. Yet in contrast with the forbidding desert coasts that we had been seeing, Valparaiso seemed a luxuriant flower garden, and the ride inland was livened for us by the sight of willows, Acacias and huge candelabra-like *Cereus*. We went directly to Santiago, the Chilean capitol, over a fine electric railroad, passing close enough to the Andes to see clearly their steep sides, and far away white peaks, one of which, Aconcagua, is the highest mountain in the Western Hemisphere.

Chile is unique among Spanish American countries in that it shelters in its Museo Nacionál at Santiago the types, or historic original specimens, of most of the species of its flora. This is due almost wholly to the enthusiastic work of one naturalized German, Dr. R. A. Philippi. Throughout the latter half of the nineteenth century he collected and studied in nearly all accessible parts of Chile, describing over 4,000 species of plants as new to science. His special collection, as well as his gifts to the National Herbarium, are preserved at the Museo Nacionál, where they are in the custody of Professor Francisco Fuentes. Although I had no special letter of introduction, I was so fortunate as to obtain the friendship as

well as the courteous aid of Professor Fuentes and of his colleague, Professor Marcial Espinosa. Indeed, these two gentlemen accompanied us on a six weeks' trip through central and southern Chile, giving us the benefit of their intimate knowledge of the flora of their native land, adding in many ways to the profit and enjoyment of our Chilean experience, and always proving the best of traveling companions. To them is largely due the success of our Chilean visit.

In company with the two Chilean professors we traveled south along the longitudinal central valley of Chile, through the rich agricultural heart of the country with its immense vineyards, ranches, and fields of maize and wheat. At nearly every station horsemen came riding in, clad in gay ponchos, with high felt hats, and leather boots with steel spurs as large as the palm of one's hand. Lumbering along the highways were ox-carts, some modern in style but more often with solid wooden disks for wheels, open to the weather but with saplings bent across the top so that ponchos could be laid over them as protection from the hot sun. Continuing southward we passed successively through the old Araucanian frontier country where the forests begin, into the section of German settlements, and on again till we reached Puerto Montt at the northern head of the inland water passages of southern Chile. There is a constant and striking similarity between the coast of Chile and that of western North America. As you go southward from the subtropical and temperate arid zones, you reach wetter and wetter climates, just as would be the case in going north along our Pacific coast, until at Puerto Montt both climate and topography recall Puget Sound. Still farther south lie the island of Chiloe and a long region of fiords and seeping wet forests just as northward of Puget Sound is Vancouver Island and the fiords of British Columbia and the Alaskan coast.

On the morning of February 6th in a downpour of rain we took the boat across to Ancud on Chiloe. Ancud, or San Carlos de Ancud as it was formerly called, founded in the early days of Spanish exploration, has long been the first port at which vessels rounding Cape Horn or the Straits of Magellan could put in for supplies. Many species of plants known from early days, as for instance the kind of *Calceolaria* that has been so extensively cultivated and hybridized, came originally from Ancud. This particular plant we were

unfortunately too late in the season to see in flower, but we gathered its seeds on the cliffs. Along the shore of the bay were rocky ledges glorious with yellow Senecios, red Escallonias and great Fuchsias, their scarlet and purple bells covering trees sometimes as large as well-grown apple trees at home. At Ancud we first collected in the heavy south Chile forest, predominantly composed of the *Nothofagus* or southern beech, but abundantly adorned with *Eucrypha*, a tree with glossy leaves and loaded in midsummer with clusters of large white blossoms. There was a dense undergrowth of bamboos, mosses and ferns, while above, on the tree-limbs, were epiphytes growing with a luxuriance that testified to the humid climate, untouched even at 42° south latitude by any severe cold.

Returning from Chiloe we left the railroad at Puerto Varas and made a short excursion into the so-called Switzerland of Chile, where a series of clear mountain lakes are encircled by snow peaks of the Andes. From Lake Todos los Santos, a body of jade-green water in a setting of darker green virgin forest, we counted nine snow peaks; there was Osorno with its perfect volcanic cone, Punto Agudo with twisted screw-like summit reflected in every detail in the water below us, and El Tronador, "the thunderer," the highest mountain in this part of Chile, towering into the sky with massive glacier-covered summit.

Somewhat to the north, the Volcan Tolhuaca, a long-extinct volcano, lies on a western spur of the Andes near the little frontier town of Curacautin. In Philippi's lifetime this part of the country was probably inaccessible on account of the fierceness of the Araucanian Indians. An invitation to visit the hacienda of Sr. Don Oswaldo Cruz gave us a rare opportunity to explore this section and to climb Tolhuaca. Unfortunately, rain commenced just as we had gotten well above timber line, but we gathered all the plants we could before following our guides on the down-trail. On this visit to Tolhuaca we secured two species of *Calceolaria* new to science, the only new members of this genus obtained in Chile.

In this brief paper there is not space to tell of all the stops we made or of all the side-trips we took from the central valley of Chile up into the mountains. In summarizing our Chilean visit suffice it to add that we stopped a few days each at Chillan, from

UPPER.—Mount Vilcanota seen from the Railroad near La Raya, Peru. Note the Dwarf Vegetation of the "Puna," and the Herd of Alpacas.
LOWER.—Lake Todos los Santos from Peulla, Chile. The Shores are Clad with Heavy Forest. From the Lake may be seen Nine Snow-clad Peaks.

which town we climbed the cordillera to the famous hot springs, at Temuco and Angol, and spent several days along the coast around Concepción and Arauco. Near Santiago we ascended the cordillera at two points, the Braden Copper Mines at El Teniente above Rancagua and Juncal on the Transandine Railroad, from which station we rode to the "Christ of the Andes" on the crest of the range. In central Chile the flora changes rapidly north and south along the mountains, so that each stop yielded quite different plants.

Once again, in Santiago, I experienced the kind interest of Professor Fuentes. The rich collections of the Museo Nacionál were made available for my study and I was able to compare all my Chilean Scrophulariaceae with the important and critically named specimens of Philippi and Reiche. The latter in his elaborate "Flora de Chile" has worked family by family over the multitudinous descriptions of Philippi, critically digesting the whole and giving a fine series of reviews. The last part published, that including the Scrophulariaceae, was issued in 1911, but has been so little distributed that the leading botanical institutions in the United States have never received copies. Unfortunately Reiche later left Chile, and the great work has not been pursued further. Professor Fuentes helped me very much by identifying to the genus and often to the species many plants of the miscellaneous collections which we had made in Chile. Perhaps his greatest liberality, however, was on behalf of the Museum in permitting me to take a series of fragments or partial specimens, which has given to our Academy actual material of many Chilean Scrophulariaceae. Also I photographed each of the type specimens of this family preserved in the museum at Santiago. Either by specimen or by photograph or by both our Academy has now obtained illustrations of more than 150 species of Scrophulariaceae which have been recorded from Chile. Although the field work in Chile was only moderately successful, due to the lateness of the season and the abnormal drought, the results of the herbarium study at the Museo Nacionál in Santiago made this part of the journey extremely valuable.

On April 1st we sailed north from Valparaiso, Chile, on the S. S. "Santa Teresa" and on the 6th landed at Mollendo, the port, or rather roadstead, of southern Peru, from which the railroad carries

the traveller up to the great tableland or "puna," famous as the seat of the Tiahuanaco and Inca civilizations. Half-way up from the sea to the puna is the Spanish city of Arequipa, than which no town of Spanish America has a lovelier setting. The city, in its green, irrigated valley, is dominated by three peaks that rise to snow. The approach by railroad is through an utter desert, remarkable enough for the crescentic gray sand dunes which gradually travel on over the hard red soil, but which leaves the stranger unprepared for the tropical beauty and the Andean background of the city. Lord Bryce terms Arequipa a city of northern Africa dropped down at the base of the Alps. Here we stayed for two busy weeks of collecting, during which, because of the heavy rains of 1925, we gathered plants everywhere, even below the altitude which has been supposed to mark the upper limit of utter desert. Below the city were many delicate and obviously ephemeral annuals, plants which, as the spring rains often fail to fall in Arequipa and scarcely extend to so low a level, must be able to pass years of their existence dormant as seeds. I suspect that many species of these plants have never before been collected for scientific study. Above the city to the base of Mt. Misti was another flora, less novel, but specially interesting to me because yielding my first Peruvian *Calceolaria* and *Bartsia*. Climbing still higher, we gathered plants up to snow on Chachani, the highest of Arequipa's peaks. Chachani is seldom climbed, as trails are bad and "soroche" or "mountain sickness" is dreaded. Using good riding mules and under experienced guidance, we left Arequipa by moonlight at 3:30 A. M., got to the mountain's base by daybreak, climbed up to the snow line and returned with abundant collections of plants, leaving the mountain's base after sundown and reaching Arequipa again by moonlight at 10 P. M.—the longest day's work afield of the expedition, about sixteen hours in the saddle.

On April 18th, not long after the railroad had been again fully repaired after the many washouts due to the floods, we finished the ascent by train to the high Titicaca tableland. By invitation we stopped at Chuquibambilla as guests of Col. R. J. Stordy, a Scotch agriculturalist of long experience in British East Africa, but who is now conducting an experimental sheep farm for the Peruvian government. Here at nearly 4000 meters altitude, I had an excel-

UPPER.—Mount Chachani seen from the Railroad near Sumbay, Peru. Note the Arid Slopes—with Sparse Covering of Xerophytic Bushes of the Asteraceae.

LOWER.—Rock-terraces of the Indians above Huaros, Peru. These are being Used in Native Agriculture Today. In June the Walls were Beautiful with Wild Growths of Lupines, Calceolarias and other Plants.

lent opportunity to gather the flora of the puna. While, like the Colombian paramos, these bleak highlands are treeless and cold, their vegetation is far more dwarfed and stunted. Never have I seen such a uniform series of dwarfed plants as those of the Peruvian puna.

Beyond Chuquibambilla the railroad toward Cuzco passes over a divide at La Raya, close beneath the glaciers of the Vilcanota. Here I was fortunately able to collect plants, after riding a freight locomotive from Chuquibambilla and obtaining permission to put my cot overnight in the station-master's room at the little neighboring station of Araranca. With an Indian porter I tramped toward the heights, making there my best acquaintance with the vegetation of the upper puna. Opposite La Raya station, at 4300 meters altitude, are extensive flats formed of the coralline, rock-like clumps of *Distichia*, a marvellous plant of the rush family with which I had already become acquainted in 1922 in the high Central Andes of Colombia. Still higher toward the ice we entered a small canyon and along a rapid stream between 4500 and 4600 meters, I was surprised to find a *Calceolaria* at an altitude which I believe is considerably above any previously recorded for this genus. Needless to say the species appears to be new to science.

The ride on to Cuzco, passing along the valley of the Vilcanota or upper Urubamba River, takes one down into a wild garden, conspicuously filled with bushy Calceolarias covered with yellow sac-like flowers, and, less abundantly, with *Alonsoa*, another genus of Scrophulariaceae, very showy with bizarre brilliant orange blossoms. At every station crowds of Indians in red and blue and yellow thronged the platforms. There seems something Mongolian in the faces and gorgeous attire of these people, a resemblance further borne out by the filth of their cities and villages. Yet these Quichua Indians, and their cousins the Aymaras, built up in times past a civilization the memory of which persists today in walls of peculiar and massive perfection. Their modern descendents are sturdy and industrious, with powerful muscles and lung capacity. Where the white man walks with difficulty in the rarified atmosphere, the Indian trots cheerfully beside him, carrying several hundred pounds of baggage.

Collecting about Cuzco in April and May brought us further

wealth of material. We explored the valley below the city, and climbed the Inca fortress-hill, Sacsaihuaman. In company with Prof. Dr. Fortunato L. Herrera, author of several books on the Cuzco flora, we took an excursion by train to the Inca ruins of Ollantaitambo, farther down the Urubamba valley. But the trip of trips, the most important single undertaking of the entire expedition, was an excursion of nine days by pack train from Cuzco, eastward over the ranges and down into the upper part of the forest into the valley of the Rio Cosñipata, an affluent of the Rio Madre de Dios. We chose the old trail by Pisac to the town of Paucartambo, sometimes, on the puna, using the ancient paved ways of the Incas, sometimes following for hours the meter wide trail high up on the canyon sides far above the roaring stream. The country was wild and deserted, but the botanical harvest was abundant. The bare hills east of Cuzco were made memorable for me by the discovery of a remarkable species of *Bartsia;* in a genus the species of which usually bear flowers that are nearly alike in color, this sort bore corollas that varied from yellow to red, purple, pink or white. In a single day's ride beyond Paucartambo, in addition to a goodly number of sorts already seen, we found eighteen Scrophulariaceae that were new to us. There were Calceolarias with rich yellow pouched flowers, Calceolarias with purse-like yellow corollas spotted with brown, Calceolarias which grew as low delicate herbs, or as stout herbs or shrubby bushes, or which as vines climbed high into the trees. There were Bartsias that were tall and sprawling, and many small heath-like sorts. Particularly interesting to me, however, was a species of *Agalinis*, the genus to which our purple foxgloves of the eastern United States are now assigned. It was distinctly related to our plants of North America, but as clearly retained features which a study of this genus had led me to regard as ancestral, thus confirming my previous hypothetical belief that *Agalinis* is of South American origin.

That night we pitched our tents against a ruined tambo that crowns the summit of the pass of Tres Cruces. From this point at sunrise of a clear day it is possible to have spread before one perhaps the grandest and most extensive view in all the Andes. But fortune rarely permits the traveler to see far down to the Amazonian forest; and we rose at dawn only to look over a sea

of clouds, although above us the sun was shining in a clear sky. Descending toward the lowland, in the cloud-zone of the forest at about 2600 meters altitude, we came to the only hacienda yet established east of the Andes on the course of the new trail which is being built by the government from Paucartambo down to navigable water on the Rio Madre de Dios. A German pioneer settler and his wife received us hospitably, and from "Pillahuata" as a base we followed the trail farther down into the forest. The trail follows a very gentle grade, by a winding course that crosses a roaring torrent and takes one by the bases of several cascades, then out on the steep slope of a wild, precipitous, canyon-like valley. Cut uniformly a meter wide, slightly over three feet, the unprotected roadway takes one higher and higher up the cliffside, until the narrow ledge is a thousand feet or more above the foaming water below. I collected as far as the trail is yet completed, down to an altitude of 2000 meters. Beyond this, work is proceeding on rock-faces that require a solid mile of blasting; farther ahead in the forest, Dr. Ericsson, the trail surveyor, told us that he has had to fight for the trail's entry against the poisoned arrows of naked savages.

On May 16th we left Cuzco for Bolivia, crossing Lake Titicaca and reaching La Paz on the 17th. We were less than a week in the metropolis of Bolivia. The visit was chiefly memorable by reason of the interest of Dr. Otto Buchtien, who showed us the museum which is being so ably developed there, and conducted me on an excursion to procure several Scrophulariaceae growing near the city. To my joy we obtained a species of *Virgularia*, a bushy relative of *Agalinis*, and one of the Andean genera that I had especially desired to see.

From La Paz we returned to Arequipa, Peru, thence to Mollendo, and then by sea to Callao and Lima, arriving there on the 3rd of June. From Lima we made one more excursion, a trip that was memorable. The little town of Canta lies back on the slopes of the cordillera northeast of Lima at an altitude of 2700 meters. In the days before the railroad was built up the Rimac valley, some fifty miles to the south, mule trains going to the coast from Cerro de Pasco used to pass through Canta. Here, about 1780, came the Spanish botanists, Ruiz and Pavon, sent by Carlos III to explore the

botanical wealth of Peru. Here, too, about 1800, came the French traveller Luis Née. Since the early nineteenth century, however, botanists visiting Peru have followed the railroad. Hence it is that Canta, although the chief historic station for plants on the western slope of the Peruvian cordillera, has been latterly so little visited that North American herbaria, and probably those in Europe outside of Spain, rarely or never contain plants therefrom. It seemed worth while to collect the flora about Canta, although reaching a place which is today so far off the beaten track is full of difficulty and discomfort.

Sixty miles of riding, perched on our baggage, in a "camion" or autotruck formed the first stage of the journey, following the government road which is now being pushed into this district with the ambition of eventually reaching Cerro de Pasco. Then succeeded fifteen miles of horseback riding over a rough mountain trail. Owing to delay in the arrival of the promised saddle animals we had to spend the night in the miserable village of Yaso, barracked in the bare room used as a school, with a camp of convict laborers just outside the door. Although "bestias," both mules and horses, arrived in the morning, they proved fewer than promised; and, one cargo-mule played out on the journey, so that it was only after three days and the utmost effort of the very friendly intendente of Canta that we at last received the cases which had been left quietly reposing in a tambo by the road. Life is leisurely in Canta, as we were convinced by daily delays in obtaining mules for the trails, but it is easy and kindly. The hotel being full, the intendente gave us his own room for sleeping quarters and basis of botanical operations. Concern about sanitation has scarcely arrived, while food is of the simplest variety and even more simply prepared.

But the natural setting of Canta is magnificent, and we pictured the young Spanish botanists of the eighteenth century enjoying the beauty of its environment and the richness of its flora, precisely as we did this past year. Canta and its neighbors, scattered as little isolated dots over the great mountain-faces, have doubtless scarcely changed in the interval. We followed the long trails that led from one town to another, followed the streams up the valleys, and hunted around many cascades and waterfalls, and felt sure

that we were gathering the same species, very likely in the same spots, as did our predecessors. To us in the United States who have only difficult and occasional access to the collections preserved in Spain, such collecting again of the earliest species described from South America and placing of the representatives of these species in our herbaria, is a matter of importance. We must also have gotten many other species not differentiated by Ruiz and Pavon, as our series of species of *Calceolaria*, for instance, is much longer than theirs. As the abnormal rains of last year had lasted into May, instead of stopping in March, the flora was still in excellent condition, excepting only the fact that delicate annuals, such as we had gotten at Arequipa, were already withered.

Canta, Obrajillo, San Buenaventura, were some of the towns reached, the names of which occur most frequently on the old botanical records. But our excursions took a larger radius, up to the old Indian town of Huaras, with its many terraced fields, and highest of all up to the rocky crest of Mount Antaycocha at 4200 meters altitude. A further plan, however, of crossing over the Cordillera by the old trail to Cerro de Pasco we reluctantly gave up. Instead, on June 27th we retraced our course to the coast.

Around Lima we found that, in accordance with the general wetness of 1925, the clouds, which each year for some three months swathe the coastal hills and promontories, had settled down earlier than usual. At the end of June, due solely to this fog or "garua," the low hills were already clothed in a succulent luxuriance. It seemed strange to tramp, as I did on my last field trip in Peru, through dense beds of growth nearly waist high and know that it all depended upon the moist atmosphere, not upon actual rains. Visitors from Lima were gathering armfuls of a beautiful yellow relative of the daffodil, a plant that made the desert slopes a veritable flower garden.

Our return home was by the Grace Liner "Santa Elisa," the vessel on which, seven months before, we had set out on our journey. The last plants gathered were during the vessel's stop at Paita on the morning of July 4th; after passing through the Panama Canal and crossing the rough but wildly beautiful Caribbean Sea, we reached New York on July 14th.

The journey, of over 12,000 miles, had been at all points interest-

ing, and it had succeeded in the two goals set for it. We had seen the southern Andes, and had gathered their flora from Canta, Peru, less than 12 degrees south latitude, through various stations of southern Peru and central Chile, south to the island of Chiloe, over 42 degrees south. Our plants totaled 2620 collection numbers, and nearly 15,000 specimens. Every genus of Scrophulariaceae which has been reported from Peru was obtained, and nearly every genus from Chile. In our collections from Peru there will prove to be many species new to science.

In concluding, I wish to thank not only those of the four botanical institutions who made this expedition possible: The Academy, the Field Museum of Natural History, the New York Botanical Garden and the Gray Herbarium of Harvard University, but also the many whom we met upon our course who most generously aided our work in their districts. To Mr. Alfred Houston, of Santiago, Chile, we owe the opportunity of visiting the Braden Copper Mines at El Teniente; to Mr. F. L. Crouse and Mr. Philip Griffin I am indebted for the success of a stop at the Instituto Agricola Bunster, Angol, Chile; to Col. and Mrs. R. J. Stordy for the chance to collect the puna flora at Chuquibambilla, Dpto. Puno, Peru; to Mr. Otto Widmer, of Cuzco, for aid in carrying out the trip to Paucartambo and the forest; to Dr. Ericsson, of Paucartambo, for important directions in his section and the invitation to "Pillahuata"; to Dr. Carlos Rospigliosi V. of Lima, for important introductions and advice; to Dr. Benjamin Patiño, deputy from Canta, for most valuable introductions in that district, and to his excellency, the prefect of Canta, for much generous aid while there; and to Dr. August Weberbauer, of Lima, Dr. Fortunato L. Herrera, of Cuzco, and Dr. Otto Buchtien of La Paz, Bolivia, for much valuable botanical information and advice. In an especial manner all our party would acknowledge our deep indebtedness to our traveling companions through Chile, the botanists, Prof. Francisco Fuentes and Prof. Marcial Espinosa. Finally, I personally would thank my wife and niece, without whose aid the acquisition of so complete and valuable a collection could not have been accomplished.

UPPER.—Least Tern, *Sterna antillarum.*
LOWER.—Common Tern, *Sterna hirundo.*
Photographed on the New Jersey Coast by Wharton Huber.

PAST AND PRESENT BIRD LIFE OF THE SOUTHERN NEW JERSEY COAST

BY WITMER STONE

In connection with the field study of the bird life of the southern New Jersey coast, in which I have been engaged for several years past with the object of preparing detailed accounts of the life histories of the various species, it has seemed desirable to gather together such information as is extant regarding the breeding sea birds of earlier times for comparison with present day conditions. The very paucity of such information seems to emphasize the importance of its publication, and it is here presented with some account of the species which still nest along the coast.

The coast of Cape May County from Great Egg Harbor southward seems always to have been the head quarters of sea bird life in New Jersey, and it is to this region that practically all of our information pertains, and to which my investigations have been primarily directed.

Our earliest records show that the bird life of the Cape was always noteworthy. De Vries mentions incidentally that in April, 1637, when he visited the spot for the first time, he saw there immense flocks of pigeons which obscured the sky while Master Evelin who visited the Cape May Indians in 1648 states: "I saw there an infinite quantity of bustards, swans, geese and fowl, covering the shores as within the like multitude of pigeons and store of turkeys, of which I tried one to weigh 46 pounds." It would seem from the latter statement to be as dangerous a thing to record the weight of game birds as to mention the length of a fish—but perhaps Master Evelin's scales were not of the present day standard.

We have also the record of Swedish settlers on the lower Delaware, visiting the Maurice River near the head of the Cape May peninsula, and killing great quantities of geese for their feathers, leaving the carcasses behind them, and of the "great abundance of eggs which the swans aud geese and ducks and other wild fowls" laid about Cape May and which were responsible for the names of Egg Island, and Little and Great Egg Harbors, though from more recent knowl-

edge the eggs probably belonged to the Gulls and Terns rather than to the Anatidae.

There is a certain ambiguity in the use of the name Cape May in the records. The older writers referred to the entire peninsula, nearly coincident with the present county of Cape May, and extending all the way from Great Egg Harbor southward. Then it was used for the county town now referred to as Cape May Court House, which was indeed the center of the original settlement; the present Cape May or Cape May City at the tip of the peninsula some ten miles south not having been established until 1850 and known to early writers as Cape Island. Therefore, many of the early bird records refer to the upper beaches rather than to the Cape May of today but the same conditions must have prevailed all along the coast and what was said of one beach applies to the others as well.

Up until 1850 this Cape May coast was a delectable spot where gunners and ornithologists found an abundance of all sorts of water birds. It was the favorite resort of Alexander Wilson and George Ord, who went down by water, landing on the Delaware Bay shore at Cape May Point or possibly at Higbee's beach, where a curious old wooden hotel building still stands, almost lost in the encroaching forest, or else traversed the Pine Barrens, crossing with some fish or oyster peddler from Camden to Great Egg Harbor. Audubon made at least one trip to this latter locality and his experiences are presented in his 'Episode'—entitled Great Egg Harbor. Later on, John K. Townsend and the Baird brothers—Spencer F. and William M.—frequently visited Cape May; Townsend and Wm. Baird married sisters of the Holmes family who lived near Cape May Court House in the old homestead which still remains in the family.

Among Prof. Baird's correspondence is a letter from his brother William, dated Schellinger's Landing, Cape Island, July 16, 1843, which gives some idea of conditions at that time. He writes:—"Gunners are so very numerous that almost all the birds are driven off except the two common species of terns (*hirundo* and *minuta*) the latter very abundant and easily got. I have seen a few Black Terns. I have seen the following: four species of tern, two Plovers, —*melodus* and *wilsonius*, Red-breasted Snipe, *Tringa semipalmata*,

pusilla and *alpina*, *Totanus maculatus*, *flavipes* and *vociferus* (not a single Willet) one Gull (*atricilla*), *Rhynchops nigra*, several Black-necked Stilts which I chase day after day but cannot get a shot at, Clapper Rail and the two Seaside finches, two White Herons, Night Heron. There is no chance at the herons however. I have put up nine birds, including two Havell's Tern and two Willson's Plover.

"Perhaps a Black-necked Stilt (lawyers they call them here) may give me a chance. Townsend's brother-in-law, who lives at the Court House fifteen miles from here, came to see me on Sunday and invited me to come up and spend some time with him. The shooting in the neighborhood is very fine. Dr. Leib of Philadelphia has been there all summer and is making a collection. He knows all the localities and I have no doubt would go out with me. The shooting will probably be better before long as I see the birds are beginning to collect in flocks and pass overhead towards what is called Five Mile Beach, every evening. They spend the day somewhere along the Bay Shore."

Another letter dated Cape May, June 16, 1845, when Wm. Baird was apparently staying with the Holmes family has the following:— "I saw a great many birds, especially Hudsonian Curlews, large flocks of which flew over our heads in the evening, constantly, as we were fishing. They were breeding. I also went to visit a breeding place of the two species of White Herons and Night Herons but the nests were only commenced and no eggs laid. There was a great number of nests, one small tree must have had twenty upon it." In this letter he also gives Spencer Baird instructions as to how to get to Cape May. He writes:—"Go to Cape Island by steam boat and to Court House, 13 miles by stage. Mrs. Hand keeps a tavern, board $3. per week: a man and boat can be got for 75c. a day."

What a pity that we have no comprehensive account of the bird life of the Cape May coast in still earlier times. But none of the men who could have written it have left us more than scattered fragments which only make us long for more. By piecing together the accounts of various species given by Wilson and Ord on the pages of the "American Ornithology" we can form some idea of conditions at the beginning of that last century.

Picture to yourself beach after beach, along the coast, with the surf rolling in just as it does today, but in place of the lines of hotels and cottages, the board walks and electric lights, fishing piers and throngs of bathers, we see only an endless stretch of gleaming strand flanked by sand dunes capped with beach grass and behind these, sometimes partly buried by them, dense thickets of cedar, scrub oak, wild cherry, holly and sumac. There are great colonies of Common Terns with nests scattered about among the dunes and at other points groups of the delicate Least Terns, with their eggs in hollows scooped in the sand just above high water mark. There are colonies too, on the lone sand flats, of the curious Skimmers, with their black and white contrasting plumage and long red bills flattened vertically, like shears. There were Gull-billed Terns, too, and doubtless Roseate and Forster's or perhaps a few of the great Royal and Caspian Terns though our records are silent as to these species. As the intruder advances, thousands of birds mount in the air and, circling about overhead in an intricate maze, give vent to a perfect bedlam of harsh cries, dashing about his head in frantic defense of their nests and young. Scurrying across the beaches go the beautiful little Piping Plovers, uttering their bell-like notes, and the larger Wilson's Plovers, first discovered by that famous ornithologist on Cape Island beach where the city of Cape May now stands, and here and there like giant Plover a pair of Oyster-catchers run along, always wary and keeping at a good distance from their pursuers. They also nest among the low dunes above high water mark. Back in the cedar thickets are the heronries where nest the beautiful Snowy Egrets in vast numbers along with Black-crowned Night Herons, Little Blue, Green, and Great Blue Herons. The trees are not tall but contain three to four nests each, while all over the ground below are scattered great quantities of egg shells, the result of the depredations of the Fish Crows which are continually hovering over the place. The Great White Egrets nest back in the Cedar Swamps of the mainland which border the larger steams flowing down into the sound.

On the salt meadows well concealed by the coarse grass the Mudhens swarm and are estimated to be "more than double in number of all the other marsh fowls." Here, too, in the wetter spots are large colonies of Laughing Gulls which, as one approaches,

rise in the air with their weird cries, like maniacal laughter, fully equalling the volume of sound produced by the tern colonies on the beach. Back here, too, nest the Willets in scattered pairs, and they also mount in the air and follow the intruder circling over his head with constant protests.

Where open places occur on the marsh, bald patches, as they are called, surrounding small, shallow pools, groups of the grotesque long-legged Stilts are nesting, and the still larger Avocets with their curious upturned bills. The whistle of the Osprey is heard on every side and there are always a few Bald Eagles in sight. Marsh Hawks, Black Ducks and Bitterns, Spotted Sandpipers and Killdeers, are also present in numbers along the edge of the marshes. Such was the summer resident bird life of the shore but in May and June and again in late July and August came the hoards of shore birds. No man living today can appreciate their numbers, but from the scattered records extant, we know that they were tremendous and in late fall and winter came the ducks and geese to throng the bays and sounds.

The casual shooting by the seaboard natives for their tables had little effect upon the abundance of the birds, nor did their gathering of the eggs of Gulls, Terns and Mudhens, but with the increasing advent of sportsmen from the interior, the toll began to tell. In June, 1843, we learn from a letter of J. P. Girard, Jr., the Long Island ornithologist, that his friend Brasher had been at Egg Harbor for a few days and had killed upwards of 1200 shore birds, and this, be it remembered, with an old muzzle-loading gun.

Baird's letter, already quoted and written a little later in the same year shows how many gunners were engaged in the slaughter. The outcome is not surprising. With reduced numbers the uncontrolled shooting and egg gathering of the natives had its effect, while the establishment of summer resorts one after another drove the birds away to the wilder spots. Year by year the nesting birds became fewer and the migrants, Plover, Snipe and Ducks, subject to ruthless bombardment not only in Cape May but all along the Atlantic Coast on their journeys to and from their breeding grounds in the far north, shrank rapidly in numbers.

The Herons and Terns, not being of value as game, escaped serious persecution until about 1880, when millinery collecting reached its

height, and at this date apparently a few of all the breeding species that I have mentioned, except the Stilt and Avocet, still nested on the Cape May shore, but the final destruction was rapid and complete.

Speaking of the Least Tern at a point a little farther up the Jersey coast, the late George Spencer Morris has written me:— "In the summer of 1884, I could no longer find Terns' eggs on the beach, and natives told me that they no longer found them there, and in the next year I remember coming upon two professional millinery gunners who had two piles about knee-high of Least and Common Terns which they said they were sending to New York." The white Herons were said to still nest on Seven Mile Beach in 1886, but by 1888 they were exterminated, one gunner having shot 73 birds in a single day. While these were supposed to have been Snowy Egrets we have not, so far as I know, a single breeding specimen from New Jersey to show which white Herons really did nest there. Thus passed the ornithological glory of the Cape May coast.

As breeding birds the white Herons, Willet, Oyster-catcher, Gull-billed Tern, Avocet, and Stilt, are gone forever. The last three and Wilson's Plover are never seen at any time, and the others only in small numbers or very rarely, as migrants. A few years ago we should have added the Least Tern, Piping Plover and Skimmer to the list of birds that breed there no more, but lately they have again been found nesting sparingly at remote places where primitive conditions remain.

The abolishing of spring shooting and the enforcement of the migratory bird treaty have increased the number of shore birds and Ducks that visit Cape May and encouraged the return of some nesting species, but against this we must reckon the excessive draining of the marshes for mosquito extermination which has destroyed the feeding grounds of Herons and waders of all kinds, so that their recent decrease in their old haunts is very noticeable.

The stretch between Cape May and the Point was formerly covered with cattail and rose mallow swamps with open salt marshes bordering Cape Island Creek as it winds its way back of South Cape May from the ponds east of the Light House. Here the Clapper and Virginia Rails and Least Bitterns bred regularly and

BLACK SKIMMER, *Rynchops nigra*.
Photographed on the New Jersey Coast by Wharton Huber (upper) and J. Fletcher Street (lower).

numbers of Green Herons came to feed, while the shallow ponds nearer the Light House were the resort of the white Herons and Great Blues. Long-billed Marsh Wrens thronged the dense cat-tail swamps and Seaside and Sharp-tailed Sparrows abounded on the open marsh. With the ditching that has been carried on so extensively the cattails and mallows have disappeared almost entirely and, only a very few Green Herons, Marsh Wrens and Seaside Sparrows, remain as summer species, with a few Rails and Sharp-tails in migration.

The change has been startling and with the taller vegetation went numerous other plants and insects which played their part in nature's organization. Whether the result has been beneficial or not only time can tell, but certain it is that, in abolishing conditions favorable to mosquitoes, many checks on their development have also been abolished and the driving away of so many birds may affect other interests as well. It is always dangerous to upset Nature's balance.

Of the water birds that still nest along the shore, the Laughing Gull has probably always been a breeding species, though doubtless many former colonies have disappeared. For thirty years past I have been acquainted with two colonies which, while varying in numbers and changing their location slightly, have persisted in practically the same places. The breeding grounds of these birds are always back on the salt meadows usually on some section cut off by tidewater creeks and thoroughfares so as to be virtually an island. The nests are located among the taller marsh grasses bordering the small creeks. At a distance one can see the gray and white birds scattered here and there about the marsh while there are always individuals putting out for the feeding grounds or coming in with food and dropping down into the grass or hovering for a moment just above. As one approaches all the birds that have been feeding young, or resting on the rafts of dead grass stranded on the meadows, rise in several installments and come beating across the marsh in full cry, their harsh calls, like mocking laughter, mingling to form a bedlam of sound.

They form an intricate maze as they wheel and circle overhead, now flapping vigorously with their long wing strokes, now sailing round in arcs of circles or, catching a favorable wind, a number will

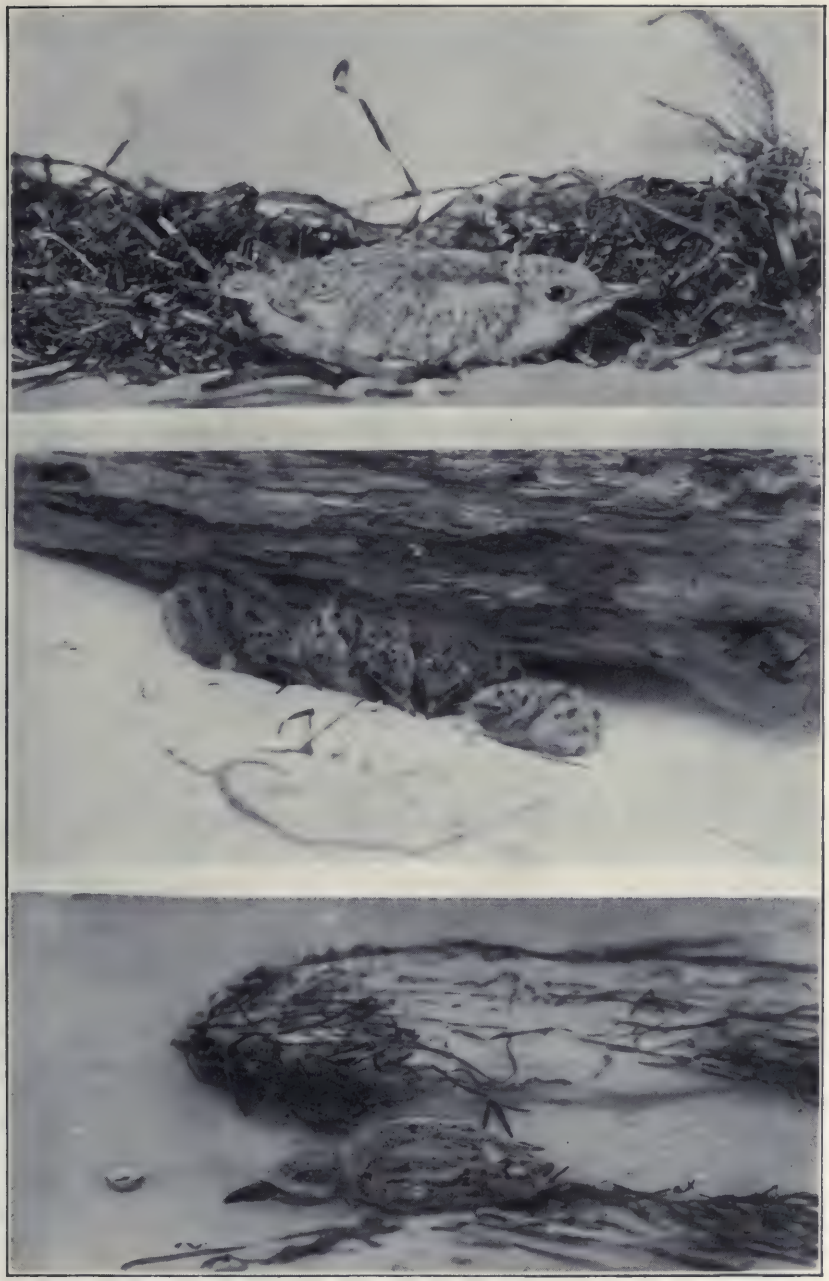
sail off a little way together returning again to the fray. As long as we remain the excitement continues, but if we approach the nests we shall find them empty, the downy young having taken shelter down among the roots of the sedge or in the water itself. These Gulls suffer frequently from the high tides which sometimes cover the meadows at nesting time and wash away the eggs, but new nests are always constructed and as neither eggs nor birds are seriously disturbed they bid fair to persist, and as they spread widely over both marsh and beach they form one of the most attractive features of the coast in summer.

The Clapper Rail or Mudhen, the other notable denizen of the coast marshes, has decreased enormously within the past twenty years and it is not easy to discover the cause. Drainage has not affected its main breeding places, the egging of past years has ceased and there are not nearly so many gunners as in former years, while the natural enemies of these birds, the Fish Crows, have become less plentiful—nevertheless the Rails have been reduced, in some places almost to the verge of extinction.

They have always been victims of the high tides which, as in the case of the Gulls, wash away their eggs and compel them to nest again, while in the past the wanton slaughter of the birds on the high autumnal tides, when they were forced to swim as the water covered the meadows, was a serious menace but seems hardly sufficient to have caused the great decrease in their numbers. Very recently there seems to be a gradual recovery which it is to be hoped may continue.

Of other marsh birds, the Black Duck, since the abolition of spring shooting, has returned as a nesting species to our New Jersey seaboard and every year many breeding pairs are located with nests back on the edge of the marshes or under bayberry bushes only a short distance from the sea beach.

Killdeers and Spotted Sandpipers have maintained their numbers without much change for thirty years past and are probably nearly as plentiful as ever, but owing to the destruction of woods and thickets on many of the island beaches, the Green Herons and Black-crowned Night Herons, which were not included in the millinery Heron slaughter, have been much reduced in numbers as breeding species, while extensive draining has destroyed many of their feeding grounds.



UPPER.—Young Least Tern.
MIDDLE.—Young Common Terns.
LOWER.—Young Black Skimmer.
Photographed on the New Jersey Coast by Wharton Huber.

It is among the beach breeders, however, that the greatest changes have taken place—the Common and Least Terns, Black Skimmer and Piping Plover. All of these, reduced at one time almost or quite to the point of extinction at most places along the coast, have in recent years returned in increasing numbers. There are today at least eight colonies of Common Terns. These are located on flat sand islands or on low projecting points not suitable for resort development. About them is a scene of wild activity. As we approached one of the larger colonies, some 300 birds arose from the flat sands and low dunes on which the nests are located and as long as we remained the air was rent with their harsh chorus. The excited birds hovered and wheeled overhead in layers, as it were, those highest up appearing no larger than swallows. There were young on the wing too, fully fledged except for their bobbed tails, while their more labored flight also distinguished them from the adults. On the sand on every side were other young, some just hatching with down still wet, others like mottled pieces of fur so closely resembling the sand and bare ground that they were easily passed by undetected, especially as they lay perfectly still, flat on their bellies with head and neck stretched straight out in front.

After the nesting is over these beautiful birds populate all the water ways of the coast and congregate in great flocks on the beaches near their fishing grounds. While constantly disturbed by passers by and by dogs running on the beach, there seems to be little deliberate attempt to destroy them, and so long as suitable nesting sites are left for them they should persist. In one colony in 1923 and 1924, there was at least one pair of Roseate Terns.

The Least Terns in 1921, had one small breeding colony which increased to three in 1925, one of which contained at least twenty pairs. They seem to prefer to keep to themselves and on the point where this colony was located, no Common Terns at all were nesting. The scene about the Least Terns' nesting ground is similar to that just described except for the smaller size of the birds and the difference in their calls, though the nests are placed closer to the strand and often in patches of pebbles or broken shells where the eggs are scarcely distinguishable.

In half a dozen similar spots on the broad sand beaches the

Piping Plover has recently been found nesting, a bird that up to 1921, was considered practically extinct on the New Jersey coast but which now occurs all along the beaches after nesting is over, sometimes as many as twenty being in sight at once.

The Black Skimmer, which by 1880, was supposed to have left our coast forever was discovered to be nesting sparingly on one of the remote beaches in 1919, where one or two pairs probably had been established for sometime previously. By 1921 there were 25 pairs nesting here and the next year another colony of at least a dozen pairs was established on another sandy island and a few pairs on a nearby point.

The Skimmers must have low flat stretches of sand, islands if possible, and persist in laying their eggs where storms and high tides often wash them away. They are very local and range while feeding only a short distance from their breeding station. The young lie in the shallow hollow which forms the nest, with head and neck outstretched like young Terns and are mottled in shades of pale gray so as to almost exactly match the sand. The grotesque adults with their curious scissor-like red bills come down the strand like a whirlwind as one approaches the nests, only to veer off to right or left as they pass, all the while uttering their peculiar reedy calls, like the hoarse barking of dogs.

It has been a great gratification to conservationists and bird lovers to see all these beautiful sea birds once more populating our shores, and to note the increase in the numbers and tameness of the migrant shore birds and of the Egrets and Little Blue Herons which wander north from the south Atlantic coasts after the nesting season. All of this has been due to the abolition of spring shooting, the continued closed season on all shore birds, excepting Yellow-legs and Black-bellied Plover and the spread of popular interest in the preservation of wild bird life.

Unfortunately, however, powerful interests are at work which seem destined to make conditions unsuitable for the nesting of many of these birds and which may cause them to again desert their old haunts.

The few remaining wild or isolated beaches in our string of coastal islands are rapidly being opened to resort development and real estate speculation, and such more or less inaccessible

UPPER.—Llamas on the Trail, Monte Blanco, Quimsa Cruz, Bolivia.
LOWER.—The La Paz Gorge, Bolivian Plateau.

spots as Brigantine and Two-Mile Beach have been connected with nearby resorts by bridges or causeways, thus destroying the isolation necessary for the maintenance of sea bird colonies.

The Terns and Skimmers must have low flat sandbars or adjacent sandy points and several of these are still available if they could be protected from ranging dogs and from too many curious visitors during the breeding period. If they could be preserved in their present "undeveloped" condition they would maintain ample colonies of sea birds for the future.

THE THIRD ACADEMY MINERALOGICAL EXPEDITION: BOLIVIA AND CHILE 1925

BY SAMUEL G. GORDON

New York City was just recovering from a severe February storm, a few ice floes were still to be seen in the East River, when the "Santa Luisa" left its Brooklyn pier, bound for the west coast of South America. Forty-eight hours later, upon entering the Gulf Stream, its passengers shed the heavy overcoats found so comfortable in the more rigorous northern climate. On the sixth day Cape Maysi marked the approach to the Caribbean, with its many flying fish—flashing silver across the fluorescent blue—which, when the crimson clouds, reflecting light from a sunken sun, had turned to purple, became alive with phosphorescent glow as stirred by the ship. Then Cristobal—a clean tropical settlement, with attractive concrete commercial structures, and cool, screened residences, in marked contrast to its neighbor, exotic Colon with its swarming dark population, predatory East Indian merchants, and crowded cabarets.

Early in the morning, as the sun rose over the dank forested hills behind Cristobal, silhouetting the trees on the banks, the "Santa Luisa" started through the canal, and approached the grand staircase of Gatun beside the old French canal. It was evening when Balboa, Panama City, and the beautiful green island of Taboga were left astern. Two days later we passed Santa Elena Point, Ecuador, and encountered the cool Humboldt current.

Many seals, dolphins and whales, gave striking evidence of a teeming life, which formed the sustenance also of millions of sea birds inhabiting the guano islands. The first port of call was Talara in the oil fields, the derricks of which were visible for miles along the arid coast. Stops at Salaverry and Callao permitted excursions to the Chimu ruins near Trujillo, and those of Pachacamac below Lima.

On Saturday morning, March 7, we arrived at Arica, a sleepy little port tucked in the corner of the Pacific, just where the South American coast turns sharply from a southeastward trend to a southerly course. Only a few years ago its sole railway ran to Tacna, an oasis in the Atacama desert. To Tacna came the rich ores of the Andes borne on llama and mule.

The international train for La Paz left on Monday evening. Throughout the night it gained in altitude, and by sunrise we had passed the giant volcanoes which form the western Cordillera and mark the boundary between the republics of Chile and Bolivia. The ice-capped granitic ranges of the eastern Cordillera soon came into view across the Bolivian plateau. The La Paz river has cut a tremendous canyon into the plateau, and at the bottom of this gorge is the city of La Paz. It is a most picturesquely set capitol. On reaching the edge of the canyon, the train winds down precipitous cliffs, past vividly colored, and grotesquely eroded pillars of sand and gravel. Dominating the horizon on the south is the ice-capped massif of Illimani, more than 21,000 feet in altitude.

Several days were spent in La Paz getting acclimated to the high altitude and the rarified air before proceeding to Oruro. Apparently, the natives have never recovered from their wonder at the railroad, for at every station the entire populace turns out to see the trains arrive and depart. The rails are lined with cholas—mixed blood Indian women, heavily clad in voluminous, gayly colored dress, vending fruit, meat cakes, or the coffee-colored intoxicating chicha.

Oruro, the chief mining center of Bolivia, is situated at the foot of a group of hills of quartz porphyry. Its population is varied in origin; while most of the inhabitants have Indian blood, there is a considerable European, as well as Syrian representation. The community center of Oruro is its large plaza. On Sundays it presents a gala aspect, for on this day the military band plays, and

the Orureños promenade around the great square in passing streams.

On Monday morning I worked my way through the dense crowds at the station to the Llallagua train. With much ceremony, a bell was rung, and the train departed. Toward noon we passed the mines of Huanuni, stated to be the first mines worked for tin in Bolivia. It was late in the afternoon when the train reached the mines of Llallagua. These mines produce about fifteen per cent of the world's annual supply of tin, as well as considerable bismuth. The tin veins are associated with a large mass of quartz porphyry which has been intruded into a fine-grained red sandstone.

While at Llallagua I made my headquarters at Catavi, the site of the mill, about a league distant from the mines. Daily, after *desayuno*, or breakfast, I mounted a mule and swung into the trail across the barren, monotonous pampa, broken here and there by an occasional ravine. Just below the mines is the native village of Llallagua, pungent with the odor of burning llama dung from the braziers of the Indian households.

At the main tunnel, the Siglo XX, the chico or boy, prepared the mine lamps. Seating ourselves on the electric locomotive, we were rushed into the tunnel for a distance of two miles—a trip made in six minutes—to the main shaft. Huge rooms had been cut into the rock, and the walls echoed with the staccato roar of the drill dressers in the blacksmith shop, and the rhythmic boom of the air compressor. Stepping into a cage we were whisked up to one of the principal levels. Numerous drifts and cross-cuts radiated out to various veins. We walked out along a track, stepping aside now and then to avoid a passing ore car, until we came to a place where we could enter a stope.

To those not familiar with mining methods, a word of explanation of stoping will be necessary. Tunnels are driven along the veins at vertical intervals of a hundred feet. These are roofed over with heavy timber. The ore in the vein is then blasted down onto the roof of the tunnel. At intervals in the roof are chutes, through which the ore can be dropped into ore cars. The miners begin at the roof of the tunnel and gradually work upward until all the ore in that section of the vein has been broken up to the next tunnel level, a hundred feet above. Such a working is called a stope.

If a stope has just been started, the climb is short. However, where there has been considerable stoping, a climb of forty or fifty feet may be necessary, or it is sometimes feasible to climb down from an upper level. Several means of access were used, differing in the amount of gymnastics required. We considered ourselves fortunate if there was a series of ladders in various stages of completeness. Missing rungs were frequent, and the reason was apparent. One morning we climbed across a space where a vein had been stoped out. On reaching the opposite end of the ladder we found that it was held in place by a single nail! The next night a fall of rock sent it crashing to the bottom. Sometimes the wooden ladder would be replaced by one of swinging wire rope. But not infrequently we had to haul ourselves up a rope, bracing the back, knees, and elbows against the rock sides. Loud shouts of "Guarde ariba"—"look out above" announced our entry into the raise, so as to avoid being greeted with a shower of rock or drill steel.

The stopes presented scenes of great industry: stolid Quechua Indians were operating compressed air drills, or were loading holes with dynamite for the noon or late afternoon blasts. Making our way over the rough floor of broken ore, we carefully examined the face of the vein overhead, and the rock walls on each side. The ore consisted largely of cassiterite, SnO_2, in black crystals or masses through quartz, associated with some bismuthinite and wolframite, and much pyrite. Small cavities were lined with twinned crystals of cassiterite. The bismuthinite formed long blades shooting through the pyrite, sometimes with apatite and vivianite. We were surprised at the large amount of the rather rare mineral wavellite, which occurred in druses of colorless crystals covering quartz crystals, or lining fractures along the walls. A single vein of vauxite and paravauxite was found in one stope.

We found ourselves wondering at the origin of this remarkable deposit, and trying to picture the event. What had caused the concentration of so much tin in the original granitic magma? Why had it been deposited in veins at this point? What were the conditions of temperature and pressure? Such problems could not be answered offhand; the phenomena were exceedingly complex, and required much study of the minerals in the vein, and their mutual relation. All pointed to interesting work in the laboratory.

UPPER.—The Chojnacota Glacier, Cordillera Quimsa Cruz, Bolivia.
LOWER.—Glacier at Laramcota, Cordillera Quimsa Cruz, Bolivia.

At noon we returned to the surface, and hustled to the dining room presided over by a smiling Japanese. The meal would be enlivened by a discussion of the specimes, or of plans for the afternoon. After *almuerzo* we wandered over the cancha and dumps. Groups of Indian women sat around piles of ore, breaking it up with heavy hammers, and rejecting the worthless material. At one o'clock we reëntered the mine. In a single day from four to seven stopes were visited. At 4:30 P. M. we gathered for tea, which was usually followed by a game of tennis before returning to Catavi.

Some difficulties were encountered in visiting the more remote portions of the mine. The examination of one vein involved climbing down 875 feet of stopes in a single morning, over 500 feet of which were by ladder. Other veins could only be visited by being lowered down a shaft by means of a steel cable at the end of which were two iron hoops into which the legs were thrust. Descents of 300 feet were made in this manner. In three weeks all the working stopes were examined in the more than fifty miles of tunnel in the mine. Fifteen cases of specimens were collected, labelled, and packed in steel-strapped boxes. They were then sewed in burlap for shipment.

Fifty miles to the east of Llallagua are the old silver mines of Colquechaca. Early one Sunday morning, we left Catavi in a coach drawn by four mules. With great skill the driver avoided the larger rocks as we careened along the road. At each native village groups of dogs rushed out to greet us, barking furiously, but an expert touch of the long whip sent them back whimpering.

After two hours and a half of shaking up, we reached Lagunas, where our mules, which had been sent ahead, were waiting. The road was soon replaced by a narrow trail leading down a gorge. The vegetation was sparse, an occasional cactus relieving the monotony of the sandstone cliffs. At the village of Chuquta the trail turned steeply up a high ridge, winding in and out gullies to gain altitude, only to reveal on the other side, other ridges to be crossed. In the afternoon we forded the Rio Blanco, at the tambo of Morochaca. The night was spent at Pocoata, a picturesque village in a beautiful green cultivated valley. The next morning the Rio Pocoata was crossed, and the village was left far below as

the trail zigzagged up the mountain. Soon after the white tower of the church on the plaza faded from view we saw the Cerro Hermosa, on the far side of which was the village of Colquechaca.

At noon we clattered down its old cobbled streets, lined with adobe houses with thatched roofs of straw. The principal mines have been practically exhausted. A small collection of minerals was obtained which included pyrargyrite, argentite, argyrodite, vivianite, and a specimen of a new mineral since named penroseite.

The next field of operations were the mines of Avicaya, Totoral, Salvador, and Montserrat, grouped about the village of Antequera, about thirty miles south of Oruro. They are easily accessible by automobile in the dry season. The road leads directly southward across the pampa, paralleling the railroad. At Poopó, it follows the shore of Lago Poopó, fed by the Rio Desaguadero which drains Lake Titicaca in the northern part of the plateau. About halfway to Pazna, high up a gulch, are the abandoned buildings of the Trinacria mine which produced the remarkable mineral cylindrite.

At Pazna, the road turns eastward from the lake. The Avicaya mines are located in the glacial cirque of the mountain east of Urmiri, a little village famous for its hot springs. The Totoral mine is on the opposite side of the mountain. The stopes of the Avicaya mines, great caverns from which the ore has been removed, look out across Lake Poopó to the distant volcanoes of the Chilean border.

The mines of Salvador are just above the village of Antequera. Like every other important silver or tin mine in Bolivia, it was worked by the Spaniards in Colonial days. But as the Castilians were interested only in gold and silver, the tin ores were untouched until 1890. The past three decades have witnessed the reopening of many old Spanish workings for tin. At the Montserrat mines, about a league to the north, old Spanish winzes follow the veins downward from the surface by means of steep, winding staircases cut into the rock. Supporting walls extend up one side of the tunnels, abutting by means of arches against the other side. The Montserrat veins are of peculiar mineralogical composition, containing the minerals teallite, $PbSnS_2$, in black platy aggregates; wurtzite, ZnS, in hexagonal brown crystals; and cassiterite, SnO_2, in yellow needles.

The last tin district visited was that of the Quimsa Cruz. The Cordillera Quimsa Cruz is practically a continuation of the massif of Illimani, being separated from it by the deep gorge of the La Paz River. Arriving at the station of Eucaliptus shortly after midnight, I walked across the sandy cancha to the hotel. After considerable pounding and kicking of the door a sleepy porter let me in. The weekly camione or motor truck left early in the morning for Pongo, and after breakfast I took my seat with the chauffeur. A few natives sitting on top of a pile of boxes and bags comprised the other passengers. Straight out across the pampa sped the machine, gradually gaining in altitude toward the distant mountains. It was not until noon that the Cordillera Quimsa Cruz, a magnificent range of glacier clad peaks, came into view. To the northeast, Illimani appeared just above the horizon, and back of us in the distance, the symmetrical volcanic cone of Sajama in the western Cordillera, each more than 20,000 feet in altitude.

Late in the afternoon we reached the pass between the Quimsa Cruz and the Santa Vela Cruz, about 15,400 feet above sea level. The road then zigzagged back and forth in gradual descent to Pongo, the site of the mill of the Caracoles tin mines. About a league below Pongo is the village of Quime, whose nearby mines produced, during the war, considerable wolframite and scheelite.

At the beginning of May, I left Pongo for a trip along the Quimsa Cruz range. The Alpine-like, ice-clad peaks reach an altitude of over 19,000 feet. Picturesque glaciers feed beautiful green and blue lakes in numerous valleys. The core of the range is granodiorite, flanked by Silurian slates which are exposed in the western valleys. Just east of the Quimsa Cruz pass, a trail leads up a narrow valley to Monte Blanco, where a lateral valley looks out over the Bolivian plateau; while to the south, the pyramid of Santa Vela Cruz towers above the surrounding country. A magnificent glacier extends from Monte Blanco to the edge of a blue lake. In the valleys to the north, Chojñacota, Laramcota, Mallachuma, and Attaromachuma, other glaciers, and numerous lakes make the district one of the most picturesque in Bolivia.

The tin mines of Viloca (Araca) are situated in a glacial gorge in the northern end of the range, surrounded by serrated peaks. The veins are in slates, near their contact with the granodiorite of

the range. These mines are noted for the beautiful translucent, hair-brown crystals of cassiterite occasionally found.

About 4 o'clock one afternoon I left the Viloca mine, for La Paz, via the La Paz River, accompanied by an Indian, with an extra mule for the baggage. As the trail dropped rapidly down the valley, the vegetation became more luxuriant, with flowers appearing on all sides. It was dark when we reached the village of Araca. After some inquiry we were directed to the Rancho Pampa, a picturesque hacienda set among the trees beyond a small brook. At four o'clock the next morning the pack mule was loaded with the baggage and a bundle of hay. An hour later we turned down the valley again; it was quite dark, but the animals followed the trail instinctively. About sunrise we came into view of Illimani, rising more than 15,000 feet above the bed of the La Paz River, to an altitude of over 21,000 feet. At 10 o'clock we reached the river level. All day long we rode up the river, fording the stream time and time again; the sun beat down unmercifully, each boulder strongly reflecting the heat. There was no drinking water, as the stream drained the city of La Paz. After fourteen hours of riding we reached the hacienda of Millacota, where we spent the night. At 3 o'clock in the morning we were up again, for there is little resting on the trail. It was noon when we reached the picturesque area below La Paz, and two more hours brought us into the center of the city.

As the train, several days later, climbed out of the La Paz gorge, I took a last look at the impressive panorama: the city overshadowed by its encircling walls, and the icy monarchs Caca-Aca and Illimani towering high above the barren, monotonous plateau. With great deliberation the locomotive hauled us southward, meandering with an occasional stream, and stopping not infrequently at some adobe station on the cheerless pampa. Beyond Oruro it skirted the salt encrusted shores of Lake Poopó. At Uyuni one division of the railway continues southward to Buenos Aires, and the other turns westward for Antofagasta in Chile. In the vicinity of Uyuni one sometimes catches a glimpse of the swift vicuña, which soon flee into the mirages of the salt plain.

The Chilean frontier is marked by the volcano Ollague, with its active fumarole, to which I had climbed in 1921. It was sunset

UPPER.—The Glacier of Monte Blanco, Quimsa Cruz, Bolivia.
LOWER.—Lake in the Cordillera Quimsa Cruz, at Monte Blanco.

when the train passed the borax lake of Ascotan in the midst of the volcanic field. Towards midnight a blaze of electric lights, on a hillside several miles to the north, identified the copper mines of Chuquicamata. Soon after, the train pulled into Calama, on the Loa River.

Several days were spent at Sierra Gorda in visiting the old mines in the desert hills nearby. Many years ago their exploitation revealed a number of rare sulfates and chlorides: daviesite, caracolite, paralaurionite, schwartzembergite, and percylite. Today only great gashes in the surface, surrounded by dumps and the remnants of buildings, indicate former activity. Sierra Gorda is situated at the western edge of the nitrate fields, and the smoke of several oficinas rise nearby.

On June 6th, at ten o'clock, I boarded a train for Antofagasta. About an hour later the news came that the entire province had been placed under military control, and it was uncertain whether the train would reach the coast. Cavalry lined the station platforms, while officers went through the train. But at five o'clock we drew into Antofagasta, and I saw the Pacific again after three months.

Two days on the steamship Teno brought me to Iquique, the famous nitrate port. On visiting the Commander of the army division in charge of the area, I received a pass to the nitrate fields. A railway, crossing the Coastal range, taps the Atacama desert. The nitrate fields are on the eastern side of the Coastal range; across the desert are the western ranges of the Andes. The whole terrain presents the picture of having been plowed up to satisfy the rapacious maw of the numerous nitrate plants or oficinas which dot the arid pampa. Here and there white-shirted workmen may be seen digging the precious salt in trenches. At frequent intervals the train draws up to a station between the two rows of wooden or corrugated iron shacks which constitute a town.

Pintados is such a town on the edge of the Pampa Tamarugal, which stretches eastward to the Andes about forty miles away. Just to the northeast of the station is the oasis of Pica, fed by many seeping springs. A few pits on the hillside of the coastal range, about a mile to the northwest, represent attempts to work small deposits of aluminium sulfates: tamarugite and pickeringite. It was here that the new mineral trudellite was found.

One other district remained to be visited, that of Copiapó, an oasis far to the south, on the Copiapó River. Several days on a passing steamer on the Pacific suffices to bring one to the port of Caldera, where a railway extends to this famous old mining center. Or, it can be reached by means of the longitudinal railway, which extends along the length of the Atacama desert. An old report listed more than 1200 mines or prospects in the vicinity of Copiapó. Nearby are the famous silver mines of Chañarcillo. Since my first visit, the earthquake of 1922 had destroyed much of the proud city, which boasted of the first gas works, railway, and telegraph of South America. Owing to the cessation of mining activity, and the desertion of many of its inhabitants to Santiago, it is doubtful whether it will ever recover its former glory. It is situated on the Copiapó River, which turns the valley into a beautiful green cultivated area, with many vineyards, orchards, and productive fields, in the midst of a barren, arid, and almost rainless desert.

Only a few miles to the southeast is Tierra Amarilla, so named from an oxidized pyrite vein which contained much copiapite, coquimbite, fibroferrite, and other iron sulfates in its outcrop. Many small copper mines are situated on the hillsides.

Visits to Santiago and Valparaiso brought this interesting trip to a close. Thirty-eight cases of specimens were obtained, including two new minerals, penroseite and trudellite, as well as a wealth of fine crystallized material for the museum, and research in the laboratory.

In conclusion I wish to express my appreciation and thanks to The Academy of Natural Sciences, Mr. George Vaux, Jr., and Mr. Frank J. Keeley, who made this trip possible; to the courtesies extended by the Patiño Mines and Enterprises Consolidated, Inc., the Asociación de Industriales Mineros de Bolivia, and W. R. Grace & Co., and their officials, as well as by many friends: Messrs. Edward F. Beale, E. J. Cornish, George W. Geere, A. G. Dibbs, Joseph Inslee, Mauricio Mollard, Francisco Bliek, A. K. Bailey, Jr., Jack Hyland, C. J. Kingston, Lester W. Strauss, J. A. Irving, W. E. Eplett, Gabriel Sznapka, Seligman Herz, E. Dowden, Jr., James Othick, Adolf Sznapka, D. van Gemeren, Teodomicro Urquiola, E. Bengel, Sergei Blajine, H. F. Grondjiis, Hencke Oolbekkink, Hugh Sandys, G. E. J. Wiessing, Louis Bollman, and Hedley J. D. Penhale.

Report of the Secretary

The duties of the Secretary during the year 1925 were particularly numerous, on account of the readjustments and rearrangements necessitated by the changed system of operation brought about by the new By-Laws, which became completely operative November 18, 1924. The election of officers and of members of the Board of Trustees, and appointment of the Council by the latter body, not being possible until the annual meeting held February 17, 1925, the Academy functioned until that date under the old organization, in accordance with a resolution to that effect adopted at the meeting of October 14, 1924.

At the meeting of January 20, 1925, nominations were made in accordance with the By-Laws, and at the annual meeting in February, the following were elected: a President, a Vice-President, a Secretary, a Treasurer, and five members of the Board of Trustees, two to serve one year, two to serve two years, and one to serve three years.

The Board of Trustees organized February 17, 1925, immediately following the meeting of the Academy at which the Board was elected. The Council as reconstituted was appointed by the Board of Trustees at its organization meeting, in accordance with the requirements of the By-Laws. The organization meeting of the Council was held March 3, 1925.

The Board of Trustees held four meetings during the year, i. e., February 17, April 3, May 6, and October 27. The principal actions taken by the Board of Trustees during the year, which affect operations or may be of interest to the members of the Academy, were as follows: appointment of a Secretary to the Board (Mr. Rehn); reappointment of Mr. Vaux as Solicitor of the Academy; appointment of Dr. Stone as Director of the Museum; appointment of Dr. Spencer Trotter as Librarian, and of Mr. Fox as Assistant Librarian; appointment of Dr. Conklin as a Vice-President, and of Dr. Moore as Corresponding Secretary, under the powers given the Board in the Charter; appointment of the Secretary of the Academy as Executive Secretary with certain supervisory powers and responsibilities; appointment of an Executive Committee of the Board

of Trustees, consisting of Dr. R. A. F. Penrose, Jr., Mr. T. Chalkley Palmer and Mr. George L. Harrison, with power to act for the Board in the intervals between its meetings; appointment of a Finance Committee and of a Library Committee; appointment of the Scientific Staff and of the Council as reconstituted; appointment of an Assistant to the Director of the Museum (Mr. Green); appointment of the Girard Trust Company as Assistant Treasurer, to act in the absence or disability of the Treasurer; appointment of Mr. John Ashhurst and Mr. Owen Wister to fill, until the next annual election, vacancies caused by death in the membership of the Board of Trustees: adoption of regulations for the signing of checks, expenditure of funds, governing duration of appointments, and covering the acceptance and acknowledgement of gifts of money and of publications; adoption of a new seal for the Academy, the design for which had been prepared under the direction of the President. All of these matters were reported to the Academy at meetings subsequent to those of the Board of Trustees at which the actions were taken.

The Council as reconstituted has held seven meetings, six stated, and one special: on March 3, March 17, April 7, May 5, October 6, November 3, and December 1. The principal actions taken by the Council of interest to members were the following: appointment of a Secretary of the Council (Mr. Rehn); appointment of a Publication Committee; appointment of an Editor (Mr. Fox); approval of the recommendation of a nominee by the Committee on the Joseph Leidy Memorial Award; appointment of a Committee on Nomination of Correspondents; authorization of the President to appoint the Committee on the Hayden Memorial Geological Award for 1926, of which he was to be Chairman; adoption of various measures to facilitate and define the handling of business falling within the province of the Council.

During the year 1925 six stated meetings and two special meetings of the Academy have been held. These were on January 13 and 20, February 17, March 17, April 21, May 12, November 17, and December 15. The attendance at these meetings ranged from thirteen to thirty-three. The average attendance of members at all meetings was twenty-two, of members and visitors at all meetings twenty-four.

No scheduled verbal communications were made at the stated meetings held during the year.

One of the special meetings was called by the President, January 13, for the presentation of a communication by Dr. Witmer Stone, on "Ornithology of the New Jersey Coast, with Special Reference to the Study of Birds in Life." The special meeting called by the President, May 12, was for the purpose of presenting the first Joseph Leidy Memorial Award to Dr. Herbert Spencer Jennings.

During the year, twenty-five members have died, and ten have resigned. The losses by death, known to the Secretary, were as follows: John Cadwalader, Col. Thomas L. Casey, Wilson Catherwood, Sabin W. Colton, Jr., James C. Corry, George W. Fiss, Benjamin W. Fleisher, Edward Goldsmith, Alfred C. Harrison, Jr., Dr. Richard H. Harte, Frederick B. Hurlburt, James Collins Jones, Algernon Sydney Logan, John D. McIlhenny, Dr. Charles B. Penrose, Mrs. Ernestine M. Schell, Mrs. George Strawbridge, W. Graham Tyler, Dr. Gilbert Van Ingen, Mrs. Mary S. Verlenden, Horace Walton, Henry W. Wenzel, Mrs. Harry F. West, Robert Whitaker, Mrs. J. William White. Of these the deaths of John Cadwalader, President of the Academy from 1918 to 1923, a member of the Board of Trustees, and long a member of the Council and of many important committees of the institution; and of Dr. Charles B. Penrose, a member of the Board of Trustees, for many years a member of the Council and also of many committees of the Academy, were particularly notable losses to the Academy. In the death of Edward Goldsmith the Academy lost a supporter who was elected a member January 25, 1868.

Mrs. Ernestine M. Schell, who died during the year, testified to her interest in the institution by making it an eventual beneficiary from her estate by the sum $10,000, to establish the "Ernestine M. Schell Fund," the income to be used for the prosecution of original research in botanical science. Mr. Cadwalader's deep interest in the Academy, was shown by his instructions directing his children to pay to it $1,000, which has been added to the principal of the General Fund.

The Academy has been informed that, by the termination of a trust created under the will of John Wister, it will receive the sum of $5,000. The interest of members and friends of the Academy has

been testified in several instances during the year, by the indication of the institution as an eventual or contingent beneficiary.

The following correspondents died during 1925:

Y. Hirase, of Kyoto, Japan; Burt G. Wilder, of Brookline, Massachusetts; Edward S. Morse, of Salem, Massachusetts.

The following individuals were elected members:

Life and Annual Members: Henry S. Borneman, Carl Boyer, Mrs. C. Reed Cary, William T. Clay, Dr. John A. Detlefsen, Harold T. Green, J. Carroll Hayes, Albert Laessle, H. S. Leach, Henry Fairfield Osborn, Jr., Anderson Polk, Rodolphe Meyer de Schauensee, Dr. J. R. Schramm, Miss Elizabeth S. Trotter, Jr., Mrs. Edward Woolman.

Junior Members: John Bartram, George S. Myers.

In recognition of his gifts to the Academy for general or special purposes, which have totalled in excess of the amount specified in the By-Laws, Dr. Richard A. F. Penrose, Jr., was designated a Benefactor of the Academy.

Three contributions made during the year warrant special mention; one of $5,000 from Dr. Penrose, to aid in meeting the legitimate expenses of the Academy during the year 1925; a second of $601 from Mr. Morris Miller Green, to assist in the physical maintenance of the buildings; a third of $500 from Mr. George L. Harrison, to be utilized at the direction of the Council. The first made possible our operations during the year without serious retrenchment, the second has aided very materially in meeting expenses for building repairs, while the third has been expended or allotted for apparatus for departmental uses or for field projects.

During the year additional fire insurance was placed upon the buildings of the Academy, to an aggregate amount of $771,000, bringing our combined building protection to a total more nearly approximating replacement costs. In addition public liability and boiler protection policies of suitable amounts were placed. The premiums for 1925 on the entire additional amount of insurance were contributed to the Academy by Dr. R. A. F. Penrose, Jr.

During the year the Academy received by gift from Dr. Penrose the design for the new seal, dies of the impressed seal and press for same, and a steel-engraved copy of the seal for use on invitations, engraved letter paper and similar documents.

Following the recommendation of the Committee on the Joseph Leidy Memorial Award and the approval of the Council of the Academy, the first Leidy Award was conferred upon Dr. Herbert Spencer Jennings, of the Johns Hopkins University, at the special meeting of the Academy held May 12, 1925. The award was made to Dr. Jennings, "in appreciation of his researches upon the Protozoa and the Rotatoria, and in recognition of his broad knowledge and keen understanding of the significance of biological phenomena."

Invitations were received for the Academy to be represented by delegates at the Kansas City meeting of the American Association for the Advancement of Science, and the Third Pan-Pacific Science Congress to be held at Tokio, Japan, October 27 to November 9, 1926.

At the December meeting of the Academy, Dr. R. A. F. Penrose, Jr., presented his resignation as President of the Academy to become operative at the next election of officers in February, 1926. Press of other duties impelled Dr. Penrose to take this step, as these responsibilities prevented him from giving to the office of President the attention and time he felt it deserves. In presenting his resignation, Dr. Penrose assured the Academy of his continued interest in and support of its work and activities. In accepting the resignation as presented, the Academy expressed in a suitable resolution its appreciation of Dr. Penrose's dignified and efficient conduct of the office of President during the past three years, and of his unselfish devotion to the interests of the institution and his generous support of its work.

JAMES A. G. REHN,
Secretary.

Report of the Treasurer

SUMMARY OF THE ACCOUNTS OF GEORGE VAUX, JR., TREASURER OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, FOR THE FISCAL PERIOD ENDED DECEMBER 31, 1925.

GENERAL FUND

RECEIPTS

Balance on hand December 31, 1924	$ 4,085.57	
Net Income from Investments	44,439.76	
Income from Estate of John Turner	155.14	
Annual Dues	5,153.00	
Interest on Bank Balances	488.29	
Publications Sold	490.42	
Miscellaneous Refunds and Receipts	396.44	$55,208.62
Transfers from Special Funds:		
For Departmental Expenses		
Mary R. D. Smith Fund	$ 75.00	
Conchological Section Fund	530.00	
Horace N. Potts Fund	215.00	
Aubrey H. Smith Fund	625.00	
J. F. Beecher Memorial Laboratory Fund	1,300.00	
For Museum and Other Purposes		
Mary Jeanes Museum Fund	900.00	
General Endowment Fund	180.00	
Thomas B. Wilson Fund	400.00	
William S. Vaux Fund (for advanced expenses)	118.64	
John H. Redfield Fund (for advanced expenses)	46.00	
James A. Meigs Fund (to cover overdraft of appropriation for purchase of books)	60.50	
Jessup Male Branch Fund	580.00	
" Female " "	240.00	
Special Donations—Contributions of R. A. F. Penrose, Jr., toward expenses of 1925	5,000.00	
Special Donations Fund—Building Maintenance, Contribution of M. M. Green	73.35	
Special Donations—Contribution of Morgan Hebard toward Salary of Preparator in Entomological Department	360.00	$10,703.49
		$65,912.11

PAYMENTS

Scientific Department and Building Maintenance		
Salaries	$32,307.50	
Museum Cases	1,927.24	
Specimens and Expeditions	1,422.43	
Maintenance (including fuel, light, water, building repairs, etc.)	6,496.52	$42,153.69

Library		
Salaries	$ 2,300.00	
Office Expenses	96.53	
Purchase of Books	1,388.05	
Binding of Books	1,318.96	$ 5,103.54
Publications		
Printing "Proceedings"	$ 2,348.65	
Printing "Year Book"	861.25	
Office Expenses	103.77	
Salaries, Editor and Artist	1,800.00	$ 5,113.67
Treasurer's Department		
Mary S. Warren on account of 1309 Arch St.	$ 1,800.00	
Audit and Bonding Expenses	130.00	$ 1,930.00
Secretary and Central Office		
Salaries	$ 4,505.00	
Office Supplies, Maintenance, Postage, etc.	1,557.67	$ 6,062.67
		$60,363.57
Balance December 31, 1925		5,548.54
		$65,912.11

CONCHOLOGICAL SECTION FUND

RECEIPTS

Net Income from Investments	$ 1,274.93

PAYMENTS

Balance December 31, 1924—Overdrawn	$ 736.36
Transferred to General Fund for Departmental Expenses	530.00
Balance December 31, 1925	8.57
	$ 1,274.93

COPE COLLECTION FUND

RECEIPTS

Balance December 31, 1924	$ 1,855.85
Net Income from Investments	1,078.97
Balance December 31, 1925	$ 2,934.82

F. V. HAYDEN MEMORIAL FUND

RECEIPTS

Balance December 31, 1924	$ 72.73
Net Income from Investments	102.26
Balance December 31, 1925	$ 174.99

HORACE N. POTTS FUND

RECEIPTS

Net Income from Investments	$ 350.77
Balance December 31, 1925—Overdrawn	100.83
	$ 451.60

PAYMENTS

Balance December 31, 1924–Overdrawn	$ 57.46
Transferred to General Fund for Departmental Expenses	215.00
Taxes on Somerton Property (one-half interest)	179.14
	$ 451.60

MARY JEANES MUSEUM FUND

RECEIPTS

Balance December 31, 1924	$ 53.57
Net Income from Investments	870.70
	$ 924.27

PAYMENTS

Transferred to General Fund for Museum Expenses	$ 900.00
Balance December 31, 1925	24.27
	$ 924.27

JESSUP FUND—MALE BRANCH

RECEIPTS

Net Income from Investments	$ 568.20
Balance December 31, 1925—Overdrawn	38.64
	$ 606.84

PAYMENTS

Balance December 31, 1924—Overdrawn	$ 26.84
Salaries to Students	580.00
	$ 606.84

JESSUP FUND—FEMALE BRANCH

RECEIPTS

Balance December 31, 1924	$ 20.82
Net Income from Investments	302.15
	$ 322.97

PAYMENTS

Salaries to Students	$ 240.00
Balance December 31, 1925	82.97
	$ 322.97

J. A. MEIGS LIBRARY FUND

RECEIPTS

Net Income from Investment	$ 556.29

PAYMENTS

Balance December 31, 1924—Overdrawn	$ 48.67
Books Purchased	498.69
Balance December 31, 1925	8.93
	$ 556.29

J. H. REDFIELD MEMORIAL FUND

RECEIPTS

Balance December 31, 1924	$ 198.93
Net Income from Investments	175.96
	$ 374.89

PAYMENTS

Plants Purchased	$ 135.76
Transferred to General Fund for expenses advanced	46.00
Balance December 31, 1925	193.13
	$ 374.89

MARY REBECCA DARBY SMITH FUND

RECEIPTS

Balance December 31, 1924	$ 3.91
Net Income from Investments	71.54
	$ 75.45

PAYMENTS

Transferred to General Fund for Departmental Expenses	$ 75.00
Balance December 31, 1925	.45
	$ 75.45

AUBREY H. SMITH FUND

RECEIPTS

Net Income from Investments	$ 785.18

PAYMENTS

Balance December 31, 1924—Overdrawn	$ 62.52
Transferred to General Fund for Departmental Expenses	625.00
Balance December 31, 1925	97.66
	$ 785.18

FRANCES LEA CHAMBERLAIN FUND

RECEIPTS

Balance December 31, 1924	$ 1,048.33
Net Income from Investments	178.48
Balance December 31, 1925	$ 1,226.81

THOMAS B. WILSON FUND

RECEIPTS

Balance December 31, 1924	$ 2.35
Net Income from Investments	489.85
	$ 492.20

PAYMENTS

Books Purchased	$ 87.01
Transferred to General Fund for Librarian's Salary	400.00
Balance December 31, 1925	5.19
	$ 492.20

WILLIAM S. VAUX FUND

RECEIPTS

Balance December 31, 1924	$ 118.85
Net Income from Investments	504.71
Miscellaneous Income	716.26
	$ 1,339.82

PAYMENTS

Minerals purchased	$ 917.69
Transferred to General Fund	118.64
Balance December 31, 1925	303.49
	$ 1,339.82

I. V. WILLIAMSON FUND

RECEIPTS

Balance December 31, 1924	$ 65.10
Net Income from Investments	1,923.44
Refund	5.95
	$ 1,994.49

PAYMENTS

Books Purchased	$ 1,930.95
Balance December 31, 1925	63.54
	$ 1,994.49

J. F. BEECHER MEMORIAL LABORATORY FUND

RECEIPTS

Balance December 31, 1924	$ 164.33
Net Income from Investments	1,132.71
Balance December 31, 1925—Overdrawn	2.96
	$ 1,300.00

PAYMENTS

Transferred to General Fund for Laboratory Expenses	$ 1,300.00

GENERAL ENDOWMENT FUND

RECEIPTS

Balance December 31, 1924	$ 2.00
Net Income from Investments	179.72
	$ 181.72

PAYMENTS

Transferred to General Fund	$ 180.00
Balance December 31, 1925	1.72
	$ 181.72

ELEANOR T. LONG FUND

RECEIPTS

Balance December 31, 1924	$ 1,000.00
Balance December 31, 1925	$ 1,000.00

JOSEPH LEIDY MEMORIAL FUND

RECEIPTS

Balance December 31, 1924	$ 50.16
Net Income from Investments	59.40
Contribution of Dr. Joseph Leidy for 1925 Award	100.00
	$ 209.56

PAYMENTS

Honorarium, 1925 Award	$ 100.00
Balance December 31, 1925	109.56
	$ 209.56

SPECIAL DONATIONS FUND

GENERAL PURPOSES

RECEIPTS

Balance on hand December 31, 1924	$	25.00
Balance December 31, 1925	$	25.00

CONTRIBUTIONS FOR ARCHEOLOGICAL CASES

RECEIPTS

Balance on hand December 31, 1924	$	9.00
A Friend		350.00
	$	359.00

PAYMENTS

Disbursed	$	300.00
Balance December 31, 1925		59.00
	$	359.00

CONTRIBUTIONS FOR PURCHASE OF BIRDS

RECEIPTS

Balance on hand December 31, 1924	$	90.00
Balance December 31, 1925	$	90.00

JOSEPH LEIDY COMMEMORATION MEETING PUBLICATION FUND

RECEIPTS

Balance on hand December 31, 1924	$	18.89
Balance December 31, 1925	$	18.89

CONTRIBUTIONS FOR VERTEBRATE ZOOLOGY

RECEIPTS

Balance on hand December 31, 1924	$	300.00
Miss Gertrude Abbott		400.00
	$	700.00

PAYMENTS

Disbursed	$	300.00
Balance December 31, 1925		400.00
	$	700.00

ZOOLOGICAL RECORD FUND

RECEIPTS

R. C. Williams, Jr.	$	15.00
J. Percy Moore		25.00
Henry Skinner		10.00
Philip P. Calvert		50.00
	$	100.00
Balance December 31, 1925	$	100.00

CONTRIBUTIONS FOR UNION LIST OF SERIALS

RECEIPTS

Balance on hand December 31, 1924	$	200.00
Balance, December 31, 1925	$	200.00

CONTRIBUTIONS FOR BUILDING MAINTENANCE

RECEIPTS

Balance on hand December 31, 1924	$ 890.00
R. A. F. Penrose, Jr.	259.29
Morris M. Green	601.00
	$ 1,750.29

PAYMENTS

Disbursed	$ 1,287.49
Transferred to General Fund	73.35
Balance December 31, 2925	389.45
	$ 1,750.29

CONTRIBUTIONS FOR CRYSTALLOGRAPHIC TABLES

RECEIPTS

Balance on hand December 31, 1924	$ 50.00
	$ 50.00

PAYMENTS

Returned contributions	$ 25.00
Balance December 31, 1925	25.00
	$ 50.00

CONTRIBUTIONS FOR ENTOMOLOGICAL PREPARATION

RECEIPTS

Morgan Hebard	$ 360.00
	$ 360.00

PAYMENTS

Transferred to General Fund for payment of Salary of Preparator	$ 360.00
	$ 360.00

CONTRIBUTIONS TO MEET EXPENSES OF ACADEMY FOR 1925

RECEIPTS

R. A. F. Penrose, Jr.	$ 5,000.00
	$ 5,000.00

PAYMENTS

Transferred to General Fund for General Expenses	$ 5,000.00
	$ 5,000.00

CONTRIBUTION FOR PREMIUMS ON ADDITIONAL INSURANCE

RECEIPTS

R. A. F. Penrose, Jr.	$ 1,300.48
	$ 1,300.48

PAYMENTS

Premiums on New Insurance Policies	$ 1,300.48
	$ 1,300.48

CONTRIBUTION FOR SOUTHERN UTAH EXPEDITION

RECEIPTS

R. A. F. Penrose, Jr.	$ 100.00
	$ 100.00

PAYMENTS

Disbursed	$ 100.00
	$ 100.00

CONTRIBUTIONS FOR 1925 COSTA RICAN EXPEDITION

RECEIPTS

George L. Harrison	$ 50.00
Childs Frick	100.00
Howard Fuguet	25.00
Frank B. Foster	50.00
Jules Mastbaum	50.00
Miss Mary E. Hebard	25.00
Edward R. Wood	20.00
William M. Meigs	25.00
Mrs. Edward Bok	50.00
Theodore F. Jenkins	25.00
Milton Campbell	50.00
J. Henry Scattergood	10.00
John C. Lowry	25.00
	$ 505.00

PAYMENTS

Contributions returned on account of postponement of expedition	505.00
	$ 505.00

SALE OF DUPLICATE MINERALS

RECEIPTS

Minerals Sold	$ 19.00
Balance Dec. 31, 1925	$ 19.00

CONTRIBUTIONS FOR EXPENDITURE BY COUNCIL

RECEIPTS

G. L. Harrison	$ 500.00
	$ 500.00

PAYMENTS

Disbursed	$ 177.75
Balance Dec. 31, 1925	322.25
	$ 500.00

CONTRIBUTIONS FOR MICROSCOPE FOR DEPARTMENT OF MOLLUSKS

RECEIPTS

T. Chalkley Palmer	$ 183.15
	$ 183.15

PAYMENTS

Disbursed	$ 183.15
	$ 183.15

CONTRIBUTION FOR PREPARATION OF DUCK SKINS

RECEIPTS

Morgan Hebard	$ 100.00
Charles M. B. Cadwalader	20.00
	$ 120.00

PAYMENTS

Disbursed	$ 120.00
	$ 120.00

Respectfully submitted,

GEORGE VAUX, JR.
Treasurer.

E. AND O. E.
PHILADELPHIA,
JANUARY 4, 1926
Correct—
MARGUERITE P. KOLLINER,
Bursar.

As the result of an audit made by us of the books and accounts of The Academy of Natural Sciences of Philadelphia, relating to "General and Special Funds," we hereby certify that the above statement is in accord therewith and in our opinion correctly reflects the results of the financial activities of the several funds during the period indicated.

(Signed) Edward P. Moxey & Co.,
Certified Public Accountants.

Philadelphia, Pa.
January 29, 1926.

REPORT OF THE TREASURER OF THE MANUAL OF CONCHOLOGY

The Treasurer of the "Manual of Conchology" respectfully reports that during the year ending December 1, 1925, the receipts from all sources were ..... $ 2,059.82
Which added to the balance on hand December 1, 1924 ..... 2,994.88
Makes a total ..... $ 5,054.70
The disbursements ..... $ 3,641.99
Leaving Balance, December 1, 1925 ..... $ 1,412.71

The receipts were as follows:

From Manual subscriptions Vol. XXVI	$ 20.00
" Manual subscriptions Vol. XXVII	110.76
" Sale of back volumes and parts	1,854.25
" Interest on daily bank balances	74.81
	$ 2,059.82

The disbursements were:

Engraving plates	$ 121.26
Advertising	4.00
Postage and expressage	16.73
Academy of Natural Sciences, for a/c "Tryon Publication Trust"	3500.00
	$ 3,641.99

The payment to the treasurer of the Academy of Natural Sciences, to be added to the Trust Fund established by the will of George W. Tryon, Jr., together with a previous payment of $4,500, makes a total of $8,000 to the credit of the said Trust Fund.

Respectfully submitted,
S. RAYMOND ROBERTS,
Treasurer.

December 1, 1925

Examined and found correct
MARGUERITE P. KOLLINER,
Bursar.

Report of the Director of the Museum

The Museum halls have been open to the public, as usual, throughout the year and large numbers of visitors have studied the exhibits.

All of the collections previously installed have been maintained and important additions made to many of them. Casts of reptiles lacking in the local collection have been supplied and the whole series adequately labelled. Casts have also been prepared and colored of the Bushmaster, one of the most notable poisonous snakes of tropical America, from a specimen presented by the Zoological Society of Philadelphia, and of several tropical fishes received from the Fairmount Park Aquarium through Dr. Henry Winsor.

To the exhibit of insects have been added a group of Monarch Butterflies illustrating their curious congested autumnal migration, life-history groups of the Ichneuman Fly (*Megarhyssa*) and Horntail Fly, (*Tremex*) from material presented by Mr. Henry Hornig, and a case illustrating the Arachinda. All of these have been prepared and the casts colored by Mr. Harold T. Green, who besides managing the Ludwick lecture courses, has had general supervision of the Museum exhibits.

Mr. Clarence B. Moore generously presented a wall case for the display of additional American Indian ethnological material from the Gottschall collection; and an interesting series of rare South American minerals obtained by Mr. S. G. Gordon has been placed on exhibition.

The usual seasonal collection of birds was installed during the spring, the various species being added, as they appeared in the vicinity of Philadelphia, so that at any given date the collection indicated the birds then present.

Many necessary and important repairs have been made to the building, especially to the roof of the north wing, the heating plant and the plumbing, while running water has been supplied to the entomological rooms. The curtains in the library reading room have been repaired and relined. Moth-proof cases for housing the constantly increasing study collections have been provided for the various departments, twenty for the botanical collections, nine for

birds and mammals, four for mollusks, and nine cases and one hundred and thirty boxes for insects.

Very important field work was carried on during the year. Dr. Francis W. Pennell, through cooperation with the Field Museum of Natural History, New York Botanical Garden, Harvard University, and Prof. Oakes Ames, sailed for South America on December 11, 1924, and spent the next seven months making botanical collections in the Andes of Peru, Bolivia and Chile (see p. 5).

Mr. Samuel G. Gordon, leaving in February for the same region, spent nearly six months in collecting mineral specimens from the various interesting mines of Bolivia and Chile, this expedition being made possible by contributions from the William S. Vaux Fund and Mr. Gordon and by the cooperation of Mr. George Vaux, Jr. (see p. 29).

A third trip was made by Dr. H. A. Pilsbry, who covered southern Utah and portions of Arizona lying north of the Colorado River, studying the molluscan fauna and securing valuable collections from this little-known region. The Academy is indebted to Dr. R. A. F. Penrose, Jr., and Mr. F. W. Pilsbry, whose generous support made this exploration possible.

Through the generosity of Mr. C. M. B. Cadwalader, Mr. Wharton Huber, was enabled to accompany him on two collecting trips to Currituck Sound, N. C. and to Okracoke, S. C., on which several hundred specimens of ducks, geese and brant, were secured for the study collection of water fowl which is being brought together at the Academy. Other members of the staff have engaged in local field work in various localities.

MAMMALS

Several valuable specimens have been received from the Zoological Society of Philadelphia, and an important collection of Bolivian mammals was obtained by purchase, representing many species hitherto lacking in the Academy's collection.

Mr. Morris M. Green, Research Associate, has presented many fine skins, with skulls, of the smaller mammals of North America, collected and prepared by himself, and has likewise spent much time in the study and arrangement of our collection. Specimens

have been loaned to Albert Laessle and certain fossil mammals to Dr. H. F. Osborn.

BIRDS

The time of Mr. Wharton Huber, Assistant Curator of Birds and Mammals, has been mainly occupied in personally directing the preparation of the series of skins of ducks and geese, secured through the generous cooperation of Mr. Charles M. B. Cadwalader, an assistant having been provided during part of the year through the further support of Mr. Cadwalader and Mr. Morgan Hebard. These specimens have been prepared with the greatest care to eliminate the fat so far as possible and ensure the permanent preservation of the skins. The series now comprises some 400 specimens representing 28 species and will prove a reference collection of the greatest importance to sportsmen and students of plumage change.

Dr. Witmer Stone, Curator of the Department of Vertebrates, has made a careful list of the genera of birds represented in the Academy's collection and efforts have been made to secure representatives of those that are lacking, nearly one hundred having been supplied during the year by purchase and exchange. A number of other interesting species new to the collection have also been secured through purchase and arrangements made through resident collectors to continue the work being carried on for the past year in Kiang Ku, China, and to secure representative series of specimens from Siam and Madagascar.

A large number of valuable birds has been presented by the Zoological Society of Philadelphia, and prepared as skins for the study collection.

The Delaware Valley Ornithological Club has held its meetings as heretofore in the ornithological rooms. Prof. Peter P. Sushkin, Dr. J. P. Chapin, Dr. Alexander Wetmore, Dr. Thomas Barbour, Bradshaw H. Swales, and other visiting ornithologists, have studied the collections; and specimens have been loaned to W. E. Clyde Todd, George M. Sutton, Dr. J. P. Chapin, the Field Museum, Harry Parker, Dr. Henry Tucker, and S. N. Rhoads.

Most of the material recently secured has been catalogued and much of it relabelled and distributed through the collection.

REPTILES AND AMPHIBIANS

The collection of reptiles and amphibians has continued in the care of Mr. Henry W. Fowler, Associate Curator of Vertebrates, and the accessions properly installed.

Mr. Karl Schmidt of the Field Museum has studied the series of Coral Snakes in connection with his monograph of the group; and specimens have also been loaned to Dr. Thomas Barbour and Dr. L. Stejneger.

FISHES

Most of Mr. Fowler's time during the year has been devoted to the collection of fishes and to the study of material sent for identification for which service the Academy is to receive duplicate series of specimens.

A report was published in the PROCEEDINGS on the South African fishes received by the Academy since 1922; and another report for the U. S. National Museum covering the Albatross collections of fishes of the families Pomacentridae, Labridae and Callyodontidae from the Philippines, Dutch East Indies and other parts of the Orient, has been nearly completed. This notable collection has been sent to the Academy in installments and the duplicates will greatly enrich our series. The collection of Oceania fishes submitted by the Museum of Comparative Zoology has also been studied and identified, as well as one sent by the Bombay Natural History Society, and several lots from the Bishop Museum in Honolulu.

A collection of New Zealand fishes, the first ever secured by the Academy from this country, was obtained by purchase during the year.

MOLLUSKS AND MARINE INVERTEBRATES

Dr. H. A. Pilsbry, Curator of this department, reports that during the year accessions to the collection have been received from 89 persons and institutions. A total of 5103 new lots of specimens have been catalogued, leaving some accessions still to be worked up. The department has received a Zeiss microscope for special investigations requiring high power, the gift of Mr. T. Chalkley Palmer.

Duplicate specimens have been supplied to two schools, and to various investigators in the U. S. National Museum, the British Museum and to a number of other workers. Information on mol-

lusks has been furnished to, or specimens classified for, 105 persons; on barnacles to 15 persons. No account was kept of information given on fossils or other groups, in reply to almost daily inquiries. In many of these cases, the study of considerable series of species was involved in this service to the public. Much of the material received in this way is new, or otherwise of considerable value for our collections.

The Curator has published three papers for the PROCEEDINGS and several in "The Nautilus," on material received, and has completed the monograph on Pupillidae in the "Manual of Conchology." Mr. Vanatta has published two papers. Dr. H. Burrington Baker, Research Associate, has published two papers dealing with our material in the PROCEEDINGS and several in "The Nautilus,"

Mr. Ralph B. Stewart, of the Palaeontological Department of the University of California, has spent several months in the study of the Gabb collection of Tertiary and Cretaceous fossils, which forms the foundation of Californian invertebrate palaeontology; and others have studied the collection of recent mollusks. Specimens have been loaned to H. B. Baker, Ralph B. Stewart, and S. N. Rhoads.

INSECTS

Dr. Henry Skinner, Curator of the Department of Entomology, reports that during the year more than three thousand specimens have been added to the collection. The larger part of these have been relaxed, mounted, labelled and incorporated in the various orders of the collections to which they belong.

Parts of the exotic Nymphalidae have been studied and placed in the new glass-topped boxes.

Mr. R. C. Williams, Jr., Research Associate, has continued his studies of the neotropical Hesperiidae and has rearranged a considerable part of the family.

Dr. Philip P. Calvert, Research Associate, has continued his studies of the order Odonata and has ably edited "Entomological News."

Mr. Frank R. Mason has given valuable volunteer assistance in the nearctic and neotropical Coleoptera, and the families Lycidae, Cantharidae and Histeridae, have been rearranged and placed in safe containers.

In Orthoptera, Mr. J. A. G. Rehn, Associate Curator, has studied the Blattidae of the Swedish Expedition to Central Africa, 1921; also carried on correlated work in portions of the same family as represented in other African series in his hands for examination. The study of the Mantidae of the Transvaal Museum's series, as well as that of the same family from the Transvaal and Natal in the collection of Academy, has been virtually completed. Small collections have been determined for a number of institutions and individuals and definite progress made on portions of the reports on several large series placed in his hands for study.

Mr. Morgan Hebard, Research Associate, has completed his study of the Orthoptera of South Dakota, revised the genera *Inscudderia* and *Belocephalus*, made progress in his studies on the Orthoptera of Panama and Colombia and completed the study of a large series of French Guianan Blattidae submitted by Dr. Lucien Chopard. He has continued the work of rearranging portions of the exotic series of Orthoptera, determined collections for a number of institutions and individuals and arranged exchanges of Hebard Collection material with the Zoological Museum, Leningrad, Russia, and other institutions. Mr. Hebard has continued to add to the Orthoptera series at the Academy by the purchase of desirable series from various parts of the world.

In Diptera the collections received for study by Mr. E. T. Cresson, Jr., Assistant Curator, from The Bishop Museum, Hawaii, the Entomologists of Cape Town, South Africa, and others, have greatly facilitated his studies in the families Ephydridae and Micropezidae. He has handled over 1600 specimens, representing about 140 species, of which the Academy receives in return for identification over 400 specimens, representing 103 species, including 24 new to the collection.

All the types of Hymenoptera have been segregated and placed in special cases.

A collection of spiders received from the Philip Nell Estate has been treated with fresh alcohol and sealed for preservation.

A rearrangement of the room containing the Coleoptera and Diptera collections has been the means of admitting more light, greatly facilitating access to these collections.

Insect types have been compared for T. D. A. Cockerell, W. J.

Brown, and J. C. Crawford, and loans have been granted to E. C. VanDyke, T. H. Frison, T. B. Mitchell, Jos. Bequaert, H. L. Viereck, Grace Sandhouse, Doris H. Blake, Henry G. Good, and W. L. McAtee.

Publications by Mr. Cresson include: (1) Another record for the female of Glutops singularis. (2) Descriptions of new genera and species of the dipterous family Ephydridae. (3) Studies in the dipterous family Ephydridae excluding the North and South American faunas.

By Mr. Rehn: (1) Zoological Results of the Swedish Expedition to Central Africa 1921.—Dermaptera. (2) Notes on West Indian Dermaptera with the Description of a new species of Vostox.

By Mr. Hebard: (1) A Revision of the Genus Taeniopoda. (2) The group Taeniopodae as found in the United States. (3) Records of European Acrididae, Tettigoniidae and Gryllidae. (4) The Orthoptera of South Dakota. (5) Dermaptera and Orthoptera from the State of Sinaloa, Mexico. Part II. Saltatorial Orthoptera. (6) The North American Genus Inscudderia.

Mr. Hebard continued through the year to contribute a portion of the salary of a preparator to mount specimens of Orthoptera and Dermaptera.

PLANTS

The herbarium has continued under the charge of the Curator, Dr. Francis W. Pennell. During 1925, about 12,000 specimens have been mounted and added to the general and local collections. This amount of yearly increment only keeps abreast of our normal yearly accessions of specimens, so that for a few years additional assistance is needed to make available for study our vast accumulation of some 100,000 unmounted specimens.

Besides the usual current accessions to the general herbarium, we have this year been able to mount the tropical American specimens from the herbarium of Dr. C. W. Short. These valuable specimens, which have been in the Academy's care since 1864, include sets of Charles Wright's plants from Cuba, Holton's from Colombia, an especially ample set of Fendler's from Venezuela, and smaller series of plants from Ecuador and Mexico. Their addition to our main herbarium strengthens this materially for the study of tropical collections.

Since the distribution to various herbaria of the plants obtained on the expedition to Colombia in 1922 (collections of Pennell, Killip and Hazen), the Academy's set has been mounted and incorporated group by group as plants of different families have been identified. At present nearly a third of these has been named by botanists in various institutions. Many species new to science have been based on these plants, in some families constituting the majority of the collection, and on the average probably about a fifth of all the species gathered. Of nearly all of these, types or isotypes remain in our herbarium forming an addition of particular value.

In addition to some miscellaneous collections, the Academy receives each year duplicates of Scrophulariaceae sent here for identification. In this, the Curator's special field, the herbarium is making its most rapid growth. During the past year we have received in this manner, or by exchange, specimens from the southern and western United States, from Europe, India, and Africa and especially notable accessions from South America. The Berlin Botanical Gardens sent us specimens from Brazil and Peru, while the Curator brought back, as exchanges from the National Museum of Chile, a series including nearly all the Chilean species of this family.

From December 11, 1924 until July 14, 1925, Dr. Pennell was absent on a botanical expedition to Peru and Chile (see p. 5) and collections of 2,620 plants were made, so far as possible in series sufficiently ample to supply a specimen to each of four cooperating institutions and to certain European herbaria. The labelling, sorting into sets, and distributing of these specimens, probably 12,000 to 15,000 in all, has consumed much time during the winter. When identified and incorporated in our herbarium, the Academy's set will constitute its most considerable series of plants from the central and southern Andes, and, like the Colombian plants of 1922, it will doubtless prove to include many species new to science.

During the past autumn, Dr. Pennell, has made a study of the Scrophulariaceae of the eastern United States, preparing revisions, with descriptions, of the species of the southeastern and of the west Gulf States for two forthcoming manuals by Dr. J. K. Small, and simultaneously prepared a paper on the species of the Middle Atlantic and north Central States for the Academy's PROCEEDINGS. On the latter account, accompanied by Dr. E. T. Wherry, nearly

two weeks in August and September were spent in field-study of the genus *Chelone* in the coastal plain of Virginia and Maryland. Not only were we fortunate in obtaining fresh specimens and in satisfactorily comparing two species of this genus which have been little-known to science, but also there were gathered for the Accademy's herbarium extensive series of plants from the immediate neighborhood of the site of the home of John Clayton, the botanist whose collections, studied both by Gronovius and Linnaeus, have formed the chief basis of the latter's knowledge of the plants of the eastern United States. As Clayton's herbarium has been preserved only in Europe, and as questions of the identity of species based upon his plants often arise, it will be particularly helpful to have in our herbarium specimens of those species that he was most likely to have collected and sent abroad.

The local herbarium continues under the care of Mr. Bayard Long, Research Associate, whose critical and thorough knowledge of the flora of the eastern United States is invaluable to the Academy. During the year various collections have been mounted and added to the local herbarium, many from collections of Mr. Long and other members of the Philadelphia Botanical Club. The quality of the specimens in our local herbarium we believe to be unsurpassed.

From early July until September, Mr. Long accompanied Prof. M. L. Fernald of Harvard University on botanical explorations in Newfoundland. The joint expeditions of these botanists, now repeated for several years, have materially increased the knowledge of the flora of the maritime provinces of Canada and of Newfoundland, both from the viewpoints of systematic and geographic botany. During the last trip much new light was gained on the affinities of the Newfoundland flora, and several further species, new either to science or to eastern North America, were encountered. Through Mr. Long's cooperation on these expeditions the Academy has been able to secure especially ample series of northeastern plants.

During the past year few papers have been published by members of this department. Dr. Pennell has two prepared for publication, "The genus Allophyton in Southern Mexico and Guatemala," and one on the pollination of two tide-water Scrophulaceae, while Mr. Long has prepared a summary of additions and changes in the local flora from 1915 to 1924.

During the year there have been many visitors to the Academy's herbaria, among those from a distance being Mr. W. W. Eggleston of the U. S. Department of Agriculture, to study *Astragalus;* Prof. Bruce Fink of Miami University, Ohio, to examine our lichens; Prof. H. M. Fitzpatrick of Cornell University, to study certain fungi; Prof. H. M. Hall of the Carnegie Institution of Washington; Dr. Roland M. Harper, of the Florida Geological Survey; Dr. I. M. Johnston, of Harvard University; Prof. J. E. Kirkwood, of the University of Montana; Prof. P. A. Munz, of Pomona College; Dr. John K. Small, of the New York Botanical Garden; and from overseas, Prof. Bungo Miyazawa, of the College of Agriculture, Miyazaki, Japan.

The local herbarium continues to be used regularly by members of the Philadelphia Botanical Club, which holds its meetings at the Academy, and help has been given in identifying unnamed specimens by Mr. Walter M. Benner, Mr. Henry A. Lang, and Dr. H. B. Meredith.

Specimens have been loaned to the Gray Herbarium, Dr. J. K. Small and Dr. N. L. Britton, F. T. McFarland, and E. B. Bartram.

MINERALS AND ROCKS

During the first half of the year, February 18 to July 28, Mr. Samuel G. Gordon, Assistant Curator, was absent on the Academy's mineralogical expedition to Bolivia and Chile. Thirty-eight cases of minerals, ores and rocks were obtained, including the new species penroseite and trudellite. Our indebtedness to the following for their kind courtesies and aid in this connection is gratefully acknowledged: the officials of the Patino Mines and Enterprises Consolidated, Inc., the Asociacion de Industriales Mineros de Bolivia, and the many friends in Bolivia and Chile who contributed to the success of the trip.

Upon Mr. Gordon's return, the crystallographic and optical investigations in the laboratory were resumed. As in the past, he enjoyed the collaboration of Drs. J. Edward Whitfield and Earl V. Shannon, who made the chemical analyses. The Department was indebted to Messrs. George Vaux, Jr., and Mr. Harry W. Trudell, for defraying the expenses incidental to the analyses. Mr. Vaux also kindly presented a suite of office furniture for the laboratory.

A more detailed report on the mineral accessions is given below in the report of the Curator of the William S. Vaux Collections.

The Philadelphia Mineralogical Society has held its meetings monthly in the Academy, with an average attendance of thirty-six. Many students have consulted the collections.

ARCHEOLOGY

Miss H. Newell Wardle has continued in charge of the collections of this department.

The additions to the collections, during the year 1924, while not numerous, included a number of old and rare specimens.

As the result of Mr. Clarence B. Moore's continued interest a series of Indian artifacts from South Carolina was received from the Charleston Museum.

The generous gift of a new wall case has permitted the display of more American Indian ethnological material from the Gottschall collection.

Miss Wardle prepared and read a paper on "A Rare Indian Knife from Montana" before the American Anthropological Association at the New Haven meeting, and represented the Academy at the dedication of the new Peabody Museum of Yale University.

LUDWICK LECTURES

The usual courses of free public lectures have been given under the auspices of the Ludwick Institute as follows:

MONDAY EVENING COURSE

January 5. "The Natural History of the New Jersey Pine Barrens." Witmer Stone, Academy of Natural Sciences of Philadelphia.

January 12. "Greenland, the Land of Desolation." Samuel G. Gordon, Academy of Natural Sciences of Philadelphia.

January 19. "How Life Begins." G. Clyde Fisher, American Museum of Natural History, New York.

January 26. "Journeys of a Naturalist along the Mexican Border." Henry A. Pilsbry, Academy of Natural Sciences of Philadelphia.

February 2. "Ancestors and Comrades of Early Man in Mongolia." Frederick K. Morris, American Museum of Natural History, New York.

February 9. "Winter Days in Southern California." Henry W. Fowler, Academy of Natural Sciences of Philadelphia.

February 16. "Wild Life of the Pantanales." George K. Cherrie, Naturalist and Explorer.

February 23. "In the Land of Sagebrush and Juniper." James A. G. Rehn, Academy of Natural Sciences of Philadelphia.

March 2. "With Gorillas and Pygmies in Central Africa." Alfred M. Collins, President of the Philadelphia Geographical Society.
March 9. "The Bird Life of the Philadelphia Region." Witmer Stone, Academy of Natural Sciences of Philadelphia.
March 16. "Wild Life and Scenery of the Catskills." S. Harmsted Chubb. American Museum of Natural History, New York.
March 23. "Natural History of our Brooks and Streams." Henry W. Fowler, Academy of Natural Sciences of Philadelphia.
March 30. "Legend and Romance of the Northwest Indian." C. J. Albrecht, American Museum of Natural History, New York.
April 6. "Camping in Papagueria." James A. G. Rehn, Academy of Natural Sciences of Philadelphia.
April 13. "Life with a Labrador Hunting Horde." Frank G. Speck, University of Pennsylvania.
April 20. "Early Scientific Explorers of America." Henry A. Pilsbry, Academy of Natural Sciences of Philadelphia.

SUNDAY AFTERNOON COURSE

January 4. "Over the Andes to the Amazon." William E. Hughes, Academy of Natural Sciences of Philadelphia.
January 11. "In the Blue Mountains of Jamaica." James A. G. Rehn, Academy of Natural Sciences of Philadelphia.
January 18. "The Rockies of Canada from End to End." J. Monroe Thorington, Philadelphia.
January 25. "Flowers of the Bogs and Marshlands." J. Fletcher Street, Delaware Valley Ornithological Club.
February 1. "Roundabout Rambles in the Canadian Rockies." Benjamin W. Mitchell, Central High School, Philadelphia.
February 8. "Australia and the Australians." Henry A. Pilsbry, Academy of Natural Sciences of Philadelphia.
February 15. "Iceland." Spencer Trotter, Swarthmore College.
February 22. "Through Yellowstone and Yosemite." Henry W. Fowler, Academy of Natural Sciences of Philadelphia.

Ten lectures were also given to children of the schools of Philadelphia and vicinity by members of the Academy's scientific staff.

The weather conditions during the early part of the courses were very bad but the attendance reached nearly 7000.

As heretofore the lectures and the school visits have been in charge of Mr. Harold T. Green.

WITMER STONE,
Director of the Museum.

REPORT OF THE CURATOR OF THE WILLIAM S. VAUX COLLECTION

Since last year's report, the William S. Vaux Collection has continued to expand, the principal accessions resulting from Mr. Gordon's expedition to Bolivia and Chile, which yielded two new species, penroseite and trudellite, as well as unique specimens of cassiterite, vivianite, vauxite and paravauxite and fine specimens of tamarugite, pickeringite, teallite, scheelite, bismuthinite, wavellite, argyrodite, paralaurionite, and jarosite.

Gifts to the collection include a particularly desirable specimen of penfieldite received from Mr. Geo. L. English, also:

Cassiterite, Avicaya, Bolivia, from Jack Hyland
Cassiterite, Araca, Bolivia, from Adolph Sznapka
Cassiterite, Araca, Bolivia, from I. Bengel
Silver on cassiterite, Morococala, Bolivia, from H. F. Grondjiis
Vauxite, Llallagua, Bolivia, from George W. Geere
Scheelite, Quime, Bolivia, from Teodomicro Urquiola
Suite of Wilmington minerals, from Alfred C. Hawkins.

A motor for polishing sections for mineralogical examination was presented by Dr. Thomas S. Stewart, and a lamp for their examination by Dr. L. C. Wills, who also, as in previous years, has prepared many of the thin sections examined in the laboratory.

Thirty-six specimens were purchased, including azurite, smithsonite and cerussite from South West Africa, and a suite of new minerals from the Kola Peninsula, Arctic Lapland.

Twenty-four specimens, chiefly species new to the collection, were received in exchange for South American duplicates from Harvard University, the U. S. National Museum, American Museum of Natural History, and Col. W. A. Roebling.

Forty-five species, not hitherto represented, have been added to the collection which now includes a total of nearly eleven thousand specimens and nine hundred and fifty-five species, as compared with fifty-three hundred specimens and four hundred and seventeen species, when it was first received by the Academy. It also has a well-equipped laboratory for crystallographical and optical research, all due to the liberality of its friends, including Goldschmidt two-circle and Babinet one-circle goniometers. Groth universal apparatus, Abbe-Spencer refractometer, Leitz and Beck petrographical microscopes, spectroscope, and sparking accessories.

This report deals extensively with benefactions received by the collection and particular stress has been placed thereon, not merely on account of the great value of specimens and instruments thus received, but also because of the gratification and encouragement that results from a realization of the extent to which friendly cooperation from so many sources has assisted in retaining the collection in its preëminent position.

As in past years, Mr. Samuel G. Gordon, on whom has developed

most of the curatorial duties, is principally responsible for the satisfactory condition of the collection.

Respectfully submitted,

F. J. KEELEY,

Curator, William S. Vaux Collections

ADDITIONS TO THE MUSEUM

1925

MAMMALS

WILLIAM S. ELLIS. Porpoise skull, North Carolina.

HARRY GARDNER. Varying Hare (black phase) (*Lepus a. americanus*).

S. G. GORDON. One skin of *Sciurus* sp.

MORRIS M. GREEN. Skins and skulls of the following Mice, Squirrels and Shrews: Two *Peromyscus maniculatus;* six *Microtus pennsylvanicus drummondi;* one *Eutamias minimus;* one *Eutamias m. borealis*; one *Blarina brevicauda;* three *Evotomys gapperi;* three *Synaptomys fatuus;* one *Peromyscus maniculatus borealis;* two *Microtus* sp.; two *Microtus drummondi;* one *Microtus* sp.; two *Peromyscus* sp.; two *Lagurus pallidus;* two *Callospermophilus cinerascens;* three *Citellus columbianus;* three *Citellus richardsonia;* three *Sciurus hudsonicus richardsoni;* one *Eutamias amoenus luteiventris;* one *Eutamias* sp.; one *Thomomys* sp.; two *Eutamias minimus borealis;* one *Neosorex palustris;* two *Eutamias amoenus luetiventris*; two *Eutamias* sp.; four *Microtus* sp.; two *Evotomys* sp.

FRANK HART. A pair of Elk Horns.

BY PURCHASE. Collection of Mammals from Bolivia.

UNIVERSITY OF CALIFORNIA, MUSEUM OF VERTEBRATE ZOOLOGY. Three skins and two skulls of Hawaiian Rat (*Rattus hawaiensis*).

ZOOLOGICAL SOCIETY OF PHILADELPHIA. Two specimens of Two-toed Sloth (*Chelopus didactylus*); specimens of Leopard (*Felis pardalis*), young female.

BIRDS

JACOB AEBLY. Bay-breasted Warbler (*Dendroica castanea*).

R. DALE BENSON, JR. One Old Squaw Duck (*Clangula hyemalis*).

E. M. BROWN. Brown Pelican (*Pelecanus occidentalis*).

CHARLES M. B. CADWALADER. Two hundred and sixty Geese, Brant, Ducks, etc.; Starling (*Sturnus vulgaris*).

WILLIAM G. CAROTHERS. Black-billed Cuckoo (*Coccyzus erythrophthalmus*); Black Duck (*Anas rubripes*) Young.

FRANK CLARK. Mounted specimen of Razor-billed Auk (*Alca torda*).

WILLIAM J. HAGERTY. One Australian Cockatoo.

J. H. KELLY. One Dovekie (*Alle alle*).

H. D. MCCANN. Three Starlings (*Sturnus vulgaris*).

B. K. MATLACK. White-crowned Sparrow (*Zonotrichia leucophrys*).

F. GUY MEYERS. Red-tailed Hawk (*Buteo borealis*).

BY PURCHASE. Twenty bird skins.

MRS. S. N. RHOADS. Indigo Bunting (*Passerina cyanea*).

E. F. SCHAAF. Cardinal (*Cardinalis cardinalis*).

RODOLPHE M. DE SCHAUENSEE. South American Heron (*Ardea cocoa*).

R. W. WEHRLE. Red-tailed Hawk (*Buteo borealis*).

ZOOLOGICAL SOCIETY OF PHILADELPHIA. Sand Grouse (*Pterocles fasciatus*); Gray-colored Canary (*Serinus canicollis*); Pink-footed Goose (*Anser brachyrhynchus*); Philippine Rail (*Hypotaenidia philippinensis*); Cassowary (*Casuarius* sp.); two White-bellied Eagles (*Haliaeetus leucogaster*); Snow Goose (*Chen. h. hyperboreus*); two Black Vultures (*Catharista urubu*); two Herring Gulls (*Larus argentatus*); Wild Turkey (*Meleagris gallopavo silvestris*); Levailliant's Parrot (*Amazona levaillanti*); (*Brotogerys tui*); Canada Goose (*Branta canadensis*); three Masked Finches (*Poephila personata*); Gannet (*Sula bassana*); Sulphur White Cockatos; Black-crested Pheasant; Rufous-headed Falcon; Great Horned Owl (*Bubo virginianus*); Purple Gallinule (*Ionornis martinicus*); two Laughing Jackasses (*Dacelo gigas*); Black Swan (*Chenopsis atrata*); Impeyan Pheasant (*Lophophoros impeyanus*); four Gouldian Finch (*Poephila gouldiae*); three Beautiful Finches (*Poephila mirabilis*); King Parroquet (*Alisterus cyanopygius*); Weaver Bird (*Pyromelana* sp.); four Plumed Pigeons (*Lophophaps plumifera*); Gray Goose (*Anser anser*); Red-headed Goose (*Chloephaga rubidiceps*); three Whistling Swans (*Olor columbianus*); Ross's Snow Goose (*Chen. rossi*); Tree Duck (*Dendrocygna viduata*); Boat-billed Heron (*Cochlearius cochlearius*); Red-tailed Hawk (*Buteo b. borealis*); Ring-necked Pheasant (*Phasianus torquatus*); Piping Crow (*Gymnorhina tibicen*); Java Starling (*Eulabes javanensis*); Brown Thrasher (*Toxostoma rufum*); *Agelaius frontalis*; Troupial (*Icterus icterus*); *Columba leuconota;* Hedge Accentor (*Accentor modularis*); *Amazona viridiginalis; Brotogerys jugularis; Eupsittula aurea; Agapornis pullarius;* Crested Penelope (*Penelope pileata*)?; Guan (*Crax globicera*); Chestnut-bellied Quail (*Callipepla squamata castaneogastris*).

MUSEUM OF COMPARATIVE ZOOLOGY. Sixteen bird skins (Exchange).

REPTILES

CAPTAIN OF SCHOONER "CUTTY SARK." One toad and two lizards.

E. A. HASSINGER. Rattlesnake (*Crotalus horridus*).

J. A. RIDER. Specimen of mounted Rattlesnake (*Crotalus horridus*).

SAMUEL SCOVILLE, JR. Specimen of Milk Snake (*Lampropeltis doliatus*).

DR. FRANK SPECK. Two jars of lizards.

R. W. WEHRLE. One specimen of Box Tortoise (*Terrapene carolina*).

FISHES

PROF. C. ANDERSON. Two Round-tailed Paradise fishes (*Macropodus opercularis*).

H. R. HILLS. Three bottles of fishes.

J. J. JAMESON. Collection of fishes.

DR. WILLIAM KENNEDY. Sword of Swordfish (*Xiphias gladius*).

BAYARD LONG. Stickle-back (*Gasterosteus aculeatus*).

G. S. MYERS. Specimen of Minnow (*Notropis cummingsi*).

PURCHASED. Collection of fifty fishes from New Zealand from the Marine Biological Fisheries Laboratory at Porto Bello, Dunedin.

UNIVERSITY OF MICHIGAN. Collection of fishes in exchange, several thousand specimens.

DR. HENRY WINSOR. Collection of fishes from Key West, Florida; jar of fresh water fishes.

VERTEBRATE FOSSILS

DR. MORSE. Skull, of *Oreodon*.

INSECTS

S. F. AARON. Seven Lepidoptera.

ACADEMY EXPEDITION OF 1924. Three hundred and seventy-one specimens of Coleoptera.

AMERICAN MUSEUM OF NATURAL HISTORY. Specimen of *Melanoplus*.

E. L. BELL. One Formosa Hesperid.

DR. JOSEPH BEQUAERT. Fifteen specimens of Orthoptera; four specimens of Hymenoptera, type and allotype.

MISS ANNETTE F. BRAUN. Seventy-one specimens of Microlepidoptera with paratypes.

DR. P. P. CALVERT. Seventeen insects; melanistic grasshopper (*Melanopus femoratus*).

ELLWOOD R. CASEY. Seven hundred and seven Orthoptera and seventy-seven other insects.

PROF. T. D. A. COCKERELL. Twelve Orthoptera; specimen of *Alichtensia attenuata;* seven specimens of Hymenoptera.

JOHN COMSTOCK. Six Lepidoptera.

W. J. COXEY. Two specimens of Hesperiidae; two moths and two Sphingidae.

COL. W. L. CRIMMINS, U. S. A. Four beetles (*Derobrachus geminatus*) and (*Cysteodemus wishizeni*); centipede, Whip-tail Scorpion and tarantula.

A. DAMPF. Twenty-five Hesperiidae.

S. T. DANFORTH. Cockroach (*Aglaopteryx diaphana*).

DR. RICHARD EBNER. Seventeen specimens of European Orthoptera (exchange).

W. FAY. *Cuterebra buccata.*

FIELD MUSEUM OF NATURAL HISTORY. Nine Chinese Orthoptera.

DR. HARRY FOX. Specimen of Scorpion.

MORGAN HEBARD. *Ornithoptera euphorion.*

H. HORNIG. Two Red Pepper Flies, *Spilographa electa.*

WILLIAM E. HUGHES. Fifty-one Lepidoptera, Haiti.

BERNARD INGRAM. Specimen of Mole Cricket.

C. W. JOHNSON. Three hundred and one specimens of Diptera.

FRANK M. JONES. Two *Problema bulenta;* forty-three Diptera.

KANSAS UNIVERSITY. Ten specimens of Diptera, *Ortalis snowi.*

PHILIP LAURENT. Four Lepidoptera (*Harrisina americana*); ten Diptera.

PROF. V. A. LITTLE. Thirteen specimens of *Mestobregma.*

BAYARD LONG. Thirty-nine Orthoptera.

FRANK R. MASON. Four Australian Diptera.

DR. H. B. MEREDITH. Six specimens of insects, Massachusetts.

R. H. PAINTER. Two specimens of Diptera.

A. F. PORTER. Eighteen Hesperidae.

C. T. RAMSDEN. One specimen of Gryllidae.

E. F. SCHAAF. Six Tropical American Blattidae and Gryllidae (*Gryllus domesticus*).

W. H. SHOEMAKER. Ninety-one Alaskan Lepidoptera (purchased).

F. M. SCHOTT. Eight specimens of Blattidae.

DR. HENRY SKINNER. Fifty-one specimens of Lepidoptera.

STOCKHOLM MUSEUM. Three Blattidae.

MISS MABEL L. H. THOMAS. Collection of Tropical Butterflies.

J. F. TRISTAN. Collection of Insects from Costa Rica.

U. S. NATIONAL MUSEUM. Twenty-two specimens of Diptera including paratypes.

M. C. VAN DUZEE. Four specimens of Diptera.

HENRY L. VIERECK. Fifteen Lepidoptera and Odonata, Colombia.

VIENNA NATIONAL MUSEUM. Ninety-one specimens of Diptera (purchased).

J. E. WALKER. Nine insects.

J. J. WHITE. Four hundred and sixteen Mexican Lepidoptera.

RECENT MOLLUSCA

J. W. ADAMS. Twelve lots of land and fresh-water shells.

AMERICAN MUSEUM OF NATURAL HISTORY. Two species of African shells.

W. D. AVERELL. One hundred and five trays of shells.

DR. F. C. BAKER. Five trays of American fresh water shells.

F. H. BAKER. Six Australian marine shells.

DR. H. B. BAKER. Fifty-one lots of land shells from Virginia.

G. M. BASSETT. Two species of land shells, Pennsylvania.

JACK BEATER. *Goniobasis catenaria* Say from Silver Springs, Florida.

DR. J. BEQUAERT. Twenty-two trays of land and fresh-water shells from Brazil.

DR. S. S. BERRY. *Oreohelix cooperi* Binn. from Montana.

DR. S. C. BISHOP. *Zonitoides arborea* Say from Kentucky.

W. E. BURNETT. *Siphonaria naufragum* St. from Amelia Island, Florida.

H. C. BURNUP. *Lauria cryptoplax* M. & P. from The Gorge, South Africa.

F. L. BUTTON. Three marine shells from California.

CALIFORNIA ACADEMY OF SCIENCES. Two trays of *Lanx alta* Tryon.

M. A. CARRIKER, JR. Six land shells from Colombia.

E. P. CHACE. *Succinea oregonensis* Lea from near Cayucas, California.

DR. A. W. CHEEVER. Three fresh-water shells from New York.

JAMES B. CLARK. Fifty-three trays of shells from Florida and Pennsylvania.

W. J. CLENCH (Exchange). Fifty-seven lots of fresh-water shells.

PROF. T. D. A. COCKERELL. Thirty-three lots of land shells from Japan and Argentina.

R. L. COLLINS. Seven species of Mexican shells.

DR. H. S. COLTON. Twenty-one species of shells from the Dr. Coleman Sellers Collection.

M. CONNOLLY. *Nesopupa griqualandica* M. & P. from Rhodesia.

PROF. C. R. CROSBY. Eighteen species of land shells from Kentucky and New York.

DR. ULRIC DAHLGREN. Three species of marine shells from Maine.

DR. H. H. DONALDSON. *Helix nemoralis* L., from Warm Springs, Virginia.

R. L. EMERY. Twenty-eight trays of shells from West Indies and Florida.

MISS E. EVANS. *Campeloma rufa imperiale* Pils. from Roxborough, Pennsylvania.

W. J. EYERDAM. Forty lots of shells from Alaska and Washington.

DR. F. FELIPPONE. Fourteen lots of fresh-water shells from Uruguay.

J. H. FERRISS. Two land shells from Texas.

W. D. FUNKHAUSER. Twenty-two species of land shells from Kentucky.

C. GOODRICH. Four fresh-water shells from Indiana and Illinois.

H. T. GREEN. *Vallonia excentrica* St. from Haddonfield, New Jersey.

MORRIS M. GREEN. Eight trays of shells from Canada.

F. HAAS. *Vertigo pygmaea* Drap. from Flix, Spain.

GEORGE L. HARRISON, JR. *Polygyra albolabris* Say from near Thomasville, North Carolina.

MORGAN HEBARD. *Modiolus papyria* Conr. from Bishop's Head, Maryland.

CHARLES HEDLEY. Four African land shells.

J. B. HENDERSON. Two *Veronicella* from Jamaica.

JUNIUS HENDERSON. Two land shells from Wyoming.

P. HESSE. *Pagodulina subdola* Gr. from Alleghe, Italy.

W. HUBER. Nine trays of American shells.

R. W. JACKSON. Eleven trays of marine shells from California and Maryland.

C. W. JOHNSON. Two species of mollusks from Maine and Pennsylvania.

F. J. KEELEY. *Viviparus georgianus* Lea from Deland, Florida.

PROF. F. J. KOFOID. *Teredo beachi* Brch. from San Francisco, California.

S. I. KORNHAUSER. Two marine shells from Louisiana.

A. LAESSLE. *Viviparus malleatus* Rve. from the Schuylkill River, Pennsylvania.

HON. F. R. LATCHFORD. Twelve trays of fresh-water shells from Canada.

N. W. LERMOND. Four marine shells from Florida.

BAYARD LONG. Twenty-four trays of land shells from Pennsylvania.

H. N. LOWE. Five marine shells from California.

J. G. MALONE. Eight trays of marine shells from Oregon.

D. P. MANNIX. Two marine shells from Bermuda and Canada.

DR. H. E. MELENEY. *Oncomelania hupiensis* Gredl. from Hankow, China.

DR. H. B. MEREDITH. Three species of shells from the Bahama Islands.

NEW YORK STATE COLLEGE OF AGRICULTURE. Six species of land shells from McLean, New York.

MRS. I. S. OLDROYD. *Leda leonina* Dall from Monterey, California.

DR. A. E. ORTMANN. *Pleurobema magnalacustris* St. from Lake Erie, Pennsylvania.

LT. COL. A. J. PEILE. Four species of land shells from Bermuda.

DR. F. W. PENNELL. Eleven trays of South American shells.

DR. H. A. PILSBRY. Two thousand five hundred and twenty-eight trays of shells from Australia.

PURCHASED. One thousand three hundred and three trays of shells.

H. A. REHDER. Seven trays of shells from the eastern United States.

J. REHN AND M. HEBARD. One species of *Physa* from Arizona.

DR. H. J. RODDY. *Anodonta cataracta* Say from Reamstown, Pennsylvania.

E. F. SCHAAF. Five species of North American shells.

HANS SCHLESCH (Exchange). Twenty-three trays of European shells.

SENCKENBERGISCHES MUSEUM (Exchange). Seventy-six trays of European land shells.

DR. B. SMITH. Seven trays of fresh-water shells from New York.

MRS. L. E. SPENCER. Five species of marine shells from Key West, Florida.

MRS. B. STARR. Fifty-eight trays of shells from New York.

DR. V. STERKI. *Physa aplectoides* St. from Garrettsville, Ohio.

DR. W. STONE. *Busycon perversa* Linn. from Cape May, New Jersey.

DR. R. W. TAYLOR. Six species of marine shells from Florida.

D. THAANUM. Three Japanese marine shells.

U. S. FISH COMMISSION. *Saxicava arctica* Linn. from Norfolk.

T. VAN HYNING. Two land shells from Florida.

DR. G. VAN INGEN. Ten trays of fresh-water shells from New York.

DR. W. G. VAN NAME. *Porphyrobaphe iostoma* Sby. from La Plata Island, Ecuador.

DR. B. WALKER. Seventeen trays of land and fresh-water shells from North and South America.

W. F. WEBB. One hundred and forty-six trays of land shells from the Philippine Islands.

N. E. WEISBORD. *Unio semigranosus* Busch from the San Pedro River, Mexico.

MISS H. WINCHESTER. Six species of marine shells from Bass Rock, Massachusetts.

OTHER INVERTEBRATES

AMERICAN MUSEUM OF NATURAL HISTORY. Four barnacles from California.

W. D. AVERELL. Four barnacles from Japan.

CAPT. CHRISTOPHER BENSON. *Astrangia* sp. from Cape Henry.

DR. F. FELIPPONE. *Balanus spongicola* Br. from Argentina.

H. W. FOWLER. One barnacle from Maryland.

R. W. JACKSON. Two barnacles from Washington.

DR. T. KINCAID. *Balanus albicostatus* Pils. from Puget Sound.

B. LONG. *Mitella polliceps* Gmel. from France.

J. G. MALONE. Eight barnacles from Oregon.

A. MILLER. *Mitella polymerus* Sowb. from Moonstone Beach, California.

DR. F. W. PENNELL. One *Chthamalus* from Chile.

DR. H. A. PILSBRY. Five jars of Australian crustacea.

U. S. DEPARTMENT OF AGRICULTURE. *Mitella polymerus* Sowb. from Washington.

U. S. NATIONAL MUSEUM. Sixteen barnacles from South America.

C. J. VAN DER HORST. Five barnacles from Venezuela.

INVERTEBRATE FOSSILS

T. H. ALDRICH. *Neritina sparcilineata* Dall from Louisiana.

PROF. T. D. A. COCKERELL. Two trays of fossils from the Isle of Wight.

R. L. EMERY. Fourteen species of fossils from Tampa Bay, Florida.

N. E. WEISBORD. *Rangia johnsoni* Dall from near Montecristo, Mexico.

PLANTS

H. D. ABBOTT. Specimens of *Cichorium* and *Cirsium* from Salem, N. J.

J. W. ADAMS. 15 specimens from the Philadelphia local area.

MRS. ROBERT ARMSTRONG. *Chamaecrista fasciculata* from Connecticut.

G. W. BASSETT. 30 specimens from local area, wild or horticultural.

S. N. BAXTER. 5 specimens of *Quercus* from local arboreta.

RUSSELL BEBBLER. 175 horticultural specimens.

W. M. BENNER. 5 specimens from Bucks Co., Pennsylvania.

BERLIN BOTANICAL GARDEN (exchange). 60 specimens of Scrophulariaceae from South America; 178 miscellaneous specimens from Tropical America, and 336 specimens from Africa.

DR. OTTO BUCHTIEN. 18 Scrophulariaceae from Bolivia.

JOSEPH CRAWFORD. 100 specimens from lower Susquehanna Valley of Pennsylvania and 6 specimens from Harford Co., Maryland.

C. C. DEAM (exchange). 126 specimens of Scrophulariaceae from Indiana.

R. R. DREISBACH. 150 specimens from the local flora; also 99 specimens from various parts of the United States.

LAWRENCE EVANS. Specimens of fungus from near Philadelphia.

WALTER EYERDAM. 71 specimens from Kamchatka.

G. FLORES. 3 specimens from Peru.

J. M. FOGG, JR. 85 specimens from the local flora.

PROF. FRANCISCO FUENTES and MARCIAL ESPINOSA. Specimens from Chile.

PROF. A. O. GARRETT. 21 specimens, chiefly Scrophulariaceae, from Utah.

GRAY HERBARIUM OF HARVARD UNIVERSITY (exchange). 132 specimens from eastern Canada and New England.

M. M. GREEN. 5 specimens from Ontario and Michigan.

T. G. HARBISON. 1 specimen of *Chelone cuthbertii* from North Carolina.

DR. R. M. HARPER. 42 specimens from Florida.

GEORGE JOHNSON. Fruiting specimen of *Castanea dentata* from Lancaster Co., Pennsylvania; *Lygodium palmatum* from Middlesex Co., New Jersey.

HILDA KAJI. 10 specimens from Pennsylvania and New Jersey.

CLARA KAST. Specimens of *Lacinaria* from Clementon, N. J.

E. P. KILLIP. 6 specimens from Maryland.

MRS. GERTRUDE P. KIRK. *Blephariglottis grandiflora* from Sullivan Co., Pennsylvania.

H. A. LANG. 200 specimens from Wissahickon Valley, Philadelphia.

A. N. LEEDS. 2 specimens from southern New Jersey.

BAYARD LONG. 1500 specimens from Pennsylvania, New Jersey and Delaware.

C. D. LIPPINCOTT. *Thlaspi arvense* from Swedesboro, N. J.

DAVID MCCADDEN. *Aureolaria pedicularia* from Chester Co., Pennsylvania.
FRÈRE MARIE-VICTORIN. 2 specimens of *Agalinis* from Quebec.
MRS. M. MATHIEU. Specimen of *Goniophlebium* from cultivation.
DR. H. B. MEREDITH. 45 specimens from Albion, N. J.
MUSEO NACIONÁL DE CHILE (exchange). 112 specimens of Scrophulariaceae from Chile and Argentina.
NEW YORK BOTANICAL GARDEN (exchange). 111 specimens mostly from the West Indies, and 100 specimens from New York, New Jersey and Connecticut.
E. J. PALMER. 29 specimens, nearly all Scrophulariaceae, from Missouri, Arkansas, Louisiana, and Mississippi.
DR. F. W. PENNELL. 2620 specimens from Peru, Chile and Bolivia; 619 specimens from Virginia, Maryland, and Delaware.
DR. H. Y. PENNELL. *Lychnis alba* from Downingtown, Pa.
DR. H. A. PILSBRY. 194 specimens from California, Utah, and Arizona.
H. W. PRETZ. 500 specimens from Lehigh Co., Pennsylvania; and 27 specimens from Washington Co., Maine.
GEORGE REDLES. 5 specimens from local flora.
ARDEE RORABAUGH. *Gentiana crinita* from Montgomery Co., Pennsylvania.
ROYAL BOTANICAL GARDENS, KEW, ENGLAND (exchange). 115 Scrophulariaceae from India, Africa, and China.
HAZEL M. SCHMOLL. 11 Scrophulariaceae from Mesa Verde National Park, Colorado.
LEE SOWDEN. 80 specimens from Virginia.
F. L. STEVENS. 9 specimens from Arica, Chile.
H. E. STONE. 200 specimens from Pennsylvania and New Jersey.
DR. WITMER STONE. Cross section of stem of *Acnida* from Cape May, N. J.
UNITED STATES DEPARTMENT OF AGRICULTURE. 100 American grasses.
UNITED STATES NATIONAL MUSEUM. 35 Scrophulariaceae from China.
UNIVERSITY OF WYOMING. 17 Scrophulariaceae from Wyoming and Colorado.
DR. W. R.TAYLOR. 500 mounted specimens from the local flora.
JANET B. WALTER. *Limodorum* from New Jersey; *Erica* from France.
DR. E. T. WHERRY. 15 Scrophulariaceae from the southeastern United States.
MARY H. WILLIAMS. 275 specimens from New Jersey and Pennsylvania.
REV. C. B. WILLIAMS. 6 specimens of flowering plants from Oklahoma.

MINERALS

E. BENGAL. Specimens of Cassiterite crystals.
EDMUND CIENKOWSKI. Specimens of Calcite.
GEORGE L. ENGLISH. Specimen of Penfieldite.
GEORGE W. GEERE. Specimen of Vauxite.
E. S. GREEN. Staurolite specimens.
H. F. GRONDJIIS. Silver on Cassiterite.
JACK HYLAND. Specimens of Cassiterite.
BAYARD LONG. Argentiferious galena.
WILLÍAM E. STOKES. Staurolite specimens.

ADOLPH SZNAPKA. Specimens of Cassiterite.
TEODOMICRO URQUIOLA. Specimens of Scheelite and other minerals.

FOSSIL PLANTS

H. A. RICHERT. Piece of petrified wood.

ARCHEOLOGY

DR. WILLIAM L. ABBOTT. 4 mats, Tananarivo, Madagascar.
ROBERT ADAMS, JR. Tobacco and pipe case, mocassins, guncase and quirt, Crow Indians.
J. RUSSEL BIBBLER. Brush made from bast of the lace-bark tree, Indians of Panama.
CHARLESTON MUSEUM (in exchange). A collection of archeological material from South Carolina.
HAROLD GREEN. Knife and sheath, natives of Northern Sudan.
BAYARD LONG. Stone knife, Newfoundland.
DAVID MCCADDEN. Model of a kayak, Greenland.
DR. H. B. MEREDITH. Indian coiled basket and Florentine pottery jar.
JOHN NEWMAN. Grooved axe, West Philadelphia.
A. E. THOMPSON. Fur clothing (coat trousers and boots) made by Eskimo, St. Lawrence Island, Alaska.
J. EDWARD WHITFIELD. Decorated bowl from a cliff dwelling, southern New Mexico; war club, catlinite pipe and tobacco pouch, Ojibwa Indians.

MISCELLANEOUS

HILDA JUSTICE. Collection of lantern slides of the late Theodore Justice.
T. CHALKLEY PALMER. Zeiss microscope.
DR. THOMAS STEWART. Polishing motor.
DR. L. C. WILLS. Microscope lamp.

American and Foreign Institutions or Organizations with which the Academy is or Recently has been Cooperating

AGRICULTURAL EXPERIMENT STATION OF THE UNIVERSITY OF MONTANA, BOZEMAN, MONTANA.
ALBANY MUSEUM, GRAHAMSTOWN, SOUTH AFRICA.
AMERICAN ASSOCIATION OF MUSEUMS.
AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK, N. Y.
ARNOLD ARBORETUM OF HARVARD UNIVERSITY, CAMBRIDGE, MASS.
AUSTRALIAN MUSEUM, SYDNEY, AUSTRALIA.
BERNICE PAUAHI BISHOP MUSEUM, HONOLULU, HAWAII.
BERLIN BOTANICAL GARDEN, BERLIN, GERMANY.
BOMBAY NATURAL HISTORY SOCIETY, BOMBAY, INDIA.
BOSTON SOCIETY OF NATURAL HISTORY, BOSTON, MASS.
BOYCE THOMPSON INSTITUTE FOR PLANT RESEARCH, YONKERS, NEW YORK.
BRITISH MUSEUM (NATURAL HISTORY), LONDON, ENGLAND.
BROOKLYN BOTANIC GARDEN, BROOKLYN, NEW YORK.
BUFFALO SOCIETY OF NATURAL HISTORY, BUFFALO, NEW YORK.
BUNSTER AGRICULTURAL INSTITUTE, ANGOL, CHILE.
CALIFORNIA ACADEMY OF SCIENCES, SAN FRANCISCO, CALIFORNIA.
CANADIAN DEPARTMENT OF AGRICULTURE.
CARNEGIE MUSEUM, PITTSBURGH, PA.
CHARLESTON MUSEUM, CHARLESTON, S. C.
COLORADO STATE MUSEUM, DENVER, COLORADO.
COLUMBIA UNIVERSITY, NEW YORK, N. Y.
CORNELL UNIVERSITY, ITHACA, N. Y.
DEPAUW UNIVERSITY, GREENCASTLE, INDIANA.
DURBAN MUSEUM, DURBAN, SOUTH AFRICA.
EWING CHRISTIAN COLLEGE, ALLAHABAD, INDIA.
FIELD MUSEUM OF NATURAL HISTORY, CHICAGO, ILLINOIS.
FLORIDA STATE GEOLOGICAL SURVEY.
GEOLOGICAL SURVEY OF CANADA.
GEOLOGICAL SURVEY OF INDIA.
GEOLOGICAL SURVEY OF NEW SOUTH WALES.
GEOPHYSICAL LABORATORY OF THE CARNEGIE INSTITUTION, WASHINGTON, D. C.
GORDON COLLEGE, RAWALPINDI, INDIA.
GOVERNMENT OF THE ANGLO-EGYPTIAN SUDAN, KHARTOUM, SUDAN.
GOVERNMENT MUSEUM, MADRAS, INDIA.
GRAY HERBARIUM, HARVARD UNIVERSITY, CAMBRIDGE, MASS.
GRINNELL COLLEGE, GRINNELL, IOWA.
HARVARD UNIVERSITY, CAMBRIDGE, MASS.
HAWAIIAN SUGAR PLANTERS' ASSOCIATION, HONOLULU, HAWAII.

HUNGARIAN NATIONAL MUSEUM, BUDAPEST, HUNGARY.
ILLINOIS STATE NATURAL HISTORY SURVEY, URBANA, ILLINOIS.
INDIANA STATE DIVISION OF FORESTRY.
INDIAN DEPARTMENT OF AGRICULTURE, PUSA, INDIA.
INDIAN MUSEUM, CALCUTTA, INDIA.
INSTITUTE FOR GENERAL BOTANY, HAMBURG, GERMANY.
INSTITUTO DE LA SALLÉ, BOGOTÁ, COLOMBIA.
LEHIGH UNIVERSITY, BETHLEHEM, PA.
KANSAS STATE AGRICULTURAL COLLEGE, MANHATTAN, KANSAS.
KARLOVA UNIVERSITA, PRAG, CZECHOSLOVAKIA.
KEW BOTANICAL GARDENS, KEW, ENGLAND.
MINERALOGICAL AND GEOLOGICAL MUSEUM OF THE UNIVERSITY OF COPENHAGEN, COPENHAGEN, DENMARK.
MINERALOGICAL MUSEUM OF THE ACADEMY OF SCIENCES, LENINGRAD, RUSSIA.
MINERALOGICAL SOCIETY, LONDON, ENGLAND.
MINERALOGICAL SOCIETY OF AMERICA.
MISSOURI BOTANICAL GARDEN, ST. LOUIS, MISSOURI.
MUSEUM OF COMPARATIVE ZOOLOGY, CAMBRIDGE, MASSACHUSETTS.
MUSEUM OF VERTEBRATE ZOOLOGY OF THE UNIVERSITY OF CALIFORNIA, BERKELEY, CALIFORNIA.
MUSEUM OF ZOOLOGY, UNIVERSITY OF MICHIGAN, ANN ARBOR, MICHIGAN.
NATAL FISHERIES COMMISSION, DURBAN, SOUTH AFRICA.
NATAL MUSEUM, PIETERMARITZBURG, SOUTH AFRICA.
NATIONAL ENTOMOLOGICAL MUSEUM, BERLIN-DAHLEM, GERMANY.
NATIONAL GEOGRAPHIC SOCIETY.
NATIONAL MUSEUM, SAN JOSÉ, COSTA RICA.
NATIONAL MUSEUM OF NATURAL HISTORY, PARIS, FRANCE.
NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
NATURAL HISTORY MUSEUM, GENEVA, SWITZERLAND.
NATURAL HISTORY MUSEUM, VIENNA, AUSTRIA.
NATURAL HISTORY MUSEUM, SAN DIEGO, CALIFORNIA.
NEW YORK ACADEMY OF SCIENCES, NEW YORK, N. Y.
NEW YORK BOTANICAL GARDEN, NEW YORK, N. Y.
NEW YORK MINERALOGICAL CLUB, NEW YORK, N. Y.
NEW YORK ZOOLOGICAL SOCIETY, NEW YORK, N. Y.
OHIO STATE UNIVERSITY, COLUMBUS, OHIO.
OXFORD MUSEUM, OXFORD, ENGLAND.
PAULISTA MUSEUM, SÃO PAULO, BRAZIL.
PENNSYLVANIA STATE GEOLOGICAL SURVEY.
PRINCETON UNIVERSITY MUSEUM, PRINCETON, N. J.
QUEENSLAND MUSEUM, BRISBANE, QUEENSLAND.
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The Academy has extended the privilege of regularly meeting within its buildings to the following organizations:

AMERICAN ENTOMOLOGICAL SOCIETY
DELAWARE VALLEY ORNITHOLOGICAL CLUB
LEIDY MICROSCOPICAL CLUB
PHILADELPHIA BOTANICAL CLUB
PHILADELPHIA MINERALOGICAL SOCIETY

Report of the Librarian

The accessions to the library during 1925, total 8,109; of these 7,369 are pamphlets and parts of periodicals, 587 volumes, 132 maps, and 21 photographs. The slight decrease from the total for 1924 is entirely due to the discontinuance of certain journals considered not essential to the Academy's interests, and which are, moreover, represented in one or more scientific libraries in Philadelphia.

The additions came from the following sources:

Exchange	4099
Isaiah V. Williamson Fund	2315
United States Department of Agriculture	495
General Appropriation for Purchase of Books	281
American Entomological Society	74
J. Aitken Meigs Fund	65
Editors	57
Authors	80
Club de Engenharia, Rio de Janeiro	55
McGill University	49
Cornell University Agricultural Experiment Station	36
Dr. Mary A. Schively	35
New York State College of Agriculture	34
Pennsylvania State Library	30
W. D. Averill	27
Cleveland Museum of Natural History	25
Miss Jane B. Haines	21
Publication Committee, Academy	19
United States Department of Commerce	18
Department of Archives and History, Alabama	16
Trustees of the British Museum	14
Thomas B. Wilson Fund	13
National Association of Marble Dealers	11
New Jersey Department of Agriculture	9
Imperial Entomologist, India	8
Utah Agricultural Experiment Station	8
Wild Flower Preservation Society, Washington D. C. Chapter	8
National Academy of Sciences	7
Museum of the American Indian, Heye Foundation	7
Pennsylvania Museum	7
Société préhistorique française	7
Finlands Geologiska Undersökning	6

Dr. Ida A. Keller	6
Pennsylvania Forestry Association	6
Dr. Henry A. Pilsbry	6
Secretaria de Agricultura y Fomento, Mexico	6
South Dakota Geological and Natural History Survey	6
Vermont Agricultural Experiment Station	6
Robert Ph. Dollfus	5
Roger Williams Park Museum	5
Statens Skogsförsöksanstalt	5
University of Wyoming School of Mines	5
Comité Special du Katanga	4
Danish Government	4
Geological Survey of Nigeria	4
Maryland Academy of Sciences	4
Clarence B. Moore	4
North Dakota Geological Survey	4
Amguedffa Genedlaethol Cymru (National Museum of Wales)	3
Australian National Research Council	3
Cushman Laboratory for Foraminiferal Research	3
William J. Fox	3
Geological Survey of Georgia	3
Indiana University	3
New York Aquarium	3
Wyoming State Geologist	3
California Department of Agriculture	2
Colorado Historical and Natural History Society	2
Geological Survey of Kentucky	2
Government of India	2
Charles Hedley	2
Illinois State Geological Survey	2
Imperial Fisheries Institute, Tokyo	2
Islenska Natturufraedisfjelag	2
Massachusetts. Division of Fisheries and Game	2
Ministère des Colonies, Belgium	2
National Research Council	2
New York State Archaeological Association, Morgan Chapter	2
State Geological Survey of Kansas	2
Union of South Africa, Fisheries and Marine Biological Survey	2
Zoological Society of Philadelphia	2
Acadian Entomological Society	1
American Association of Museums	1
Board of Water Supply of the City of New York	1
Canada. Dominion Fuel Board	1
Colombo Museum	1
Colorado Museum of Natural History	1

Direccion de la Edicion Official de las Obras y Correspondencia de Florentino Ameghino 1
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These were distributed into the various departments of the library as follows:

Journals	6057	Voyages and Travels	63
Agriculture	702	Ornithology	39
Geology	570	Conchology	24
General Natural History	180	Anthropology	19
Geography	166	Mineralogy	17
Botany	128	Anatomy and Physiology	8
Entomology	95	Physical Sciences	8

Ichthyology	8	Mammalogy	2
Helminthology	6	Medicine	2
Bibliography	5	Philology	1
Chemistry	4	Miscellaneous	2
Herpetology	3		

Seven hundred and ninety-six volumes were bound and one repaired. Unfortunately, it was again necessary to transfer part of the appropriation for binding to the purchase of books. In this connection, if the Academy is to maintain its present high position among the scientific libraries of America, additional funds will be necessary to meet the increased prices and the ever-increasing number of new journals.

Twenty-eight volumes and 260 pamphlets and parts of periodicals, not of interest to the Academy's library, were transferred to the Free Library of Philadelphia.

One hundred and twenty-seven volumes and parts of periodicals were borrowed by members; and 1,554 were used on the premises by the scientific staff. It may be well to indicate here that journals and other strictly reference books, are no longer loanable.

The following new journals and transactions were acquired either by exchange or purchase:

Abhandlungen des Archiv für Molluskenkunde.
Académie des Belles Lettres, Sciences & Arts, La Rochelle, Seance Publique.
Alpen (Die) (Les Alpes).
American Journal of Sociology.
American Sociological Society, Publications.
Annales de Parasitologie.
Anzeiger für vorgeschichtliche und geschichtliche Hilfswissenschaften.
Archiv für Hydrobiologie, Literatur Supplement.
Archivos de Botanica do Estado de S. Paulo.
Aus der Heimat.
Aus der Natur und Museum.
Beiträge und Sammelarbeiten zur Rassenkunde Europas.
Bibliographica Genetica.
Biologische Wolga-Station, Arbeiten; Monographien.
Botanisches Echo.
Bothalia.
Canada. Department of Mines, Mines Branch, Investigation in Ceramics and Road Material; and Investigations in Ore Dressing and Metallurgy.
Ceylon Journal of Science, Series A Botany.
Cleveland Museum of Natural History, Bulletin.

Cushman Laboratory for Foraminiferal Research, Contributions.
Darwiniana.
Dominion Museum, Wellington, Bulletin and Report.
Embryologiska Studier, Stockholm, 1875.
Erde (Die).
Facultad de Ciencias de la Universidad de Barcelona, Publicaciones de la Seccion de Ciencias Naturales; and Publicaciones del laboratorio de Fitopatologia.
Field Museum of Natural History, Museum Technique Series.
Finlands Fiskerier.
Fiskirannsóknir, Reykjavik.
Fortschritte der Geologie und Palaeontologie.
Gesellschaft für Erdkunde zu Berlin, Zeitschrift Ergänzungheft.
Göteborgs Botaniska Trädgård, Meddelanden (Hortus Gothoburgensis, Acta).
Havsforskningsinstitutets Skrift, Helsingfors.
Hortus Botanicus Reipubl. Rossicae, Notulae Systematicae ex Instituto Cryptogamico.
Illinois State Geological Survey, Research Contributions.
Imperial Fisheries Institute, Tokyo, Journal.
Indian Medical Research Memoirs.
Institut des Recherches Biologiques et Station Biologique à l'Université de Perm, Bulletin.
Institut des Sciences Naturelles de Péterhoff, Travaux.
Instituto de Butantan, Memórias.
Islenska Natturfraedisfjelag, Skyrsla.
Iwata Institute of Plant Biochemistry, Publication.
Journal de Géologie, 3 vols. 1830–31.
Journal of Helminthology.
Kungl. Svenska Vetenskapsakademia, Skrifter i Naturskyddsärenden.
Landbouwhoogeschool, Wageningen, Mededeelingen.
Lingnaam Agricultural Review.
Liverpool School of Tropical Medicine, Memoirs, New Series.
Luonnon Ystävä.
McGill University, Bionomical Leaflets.
Medical Repository, New York. Vols. 1 (3rd edition, 1815)–15 (1812).
Mental Hygiene.
Monographien zur Geologie und Paleontologie.
Museu Nacional do Rio de Janeiro, Publicação.
Museum Ferdinandeum in Innsbruck, Veröffentlichungen.
Naturalist (The), Austin, Texas, and the continuation: The Oregon Naturalist.
Naturforschende Gesellschaft in Danzig, Abhandlungen.
Naturfreund (Der).
Natuurbeschouwer. 'sGravenhage. 1779–82.
Nigeria. Geological Survey, Occasional Papers.
Norsk Ornithologisk Tidsskrift.
Nyasaland Procterate. Geological Survey, Annual Report; Bulletin; and Water Supply Paper.

Osterreichische Gartenbau-Gesellschaft, Wien. Tätigskeitbericht.
Oklahoma Academy of Sciences, Proceedings.
Ornithologischer Verein in Wien, Mittheilungen (Die Schwalbe).
Pallasia.
Pennsylvania Department of Agriculture, Circular.
Polskiego Towarzystwo Geologicznego w Krakowie, Rocznik.
Protozoology.
Repertorium specierum novarum regni vegetabilis, Beihefte; and Sonderheft A.
Republica Argentina. Dirección General de Minas, Geologiá e Hidrolojia (Section Quimica Mineral y Aguas Minerales), Publicación.
Resumptio Genetica.
Revista Argentina de Botanica.
Revue de Pathologie Végétale.
Russia. Comité Géologique, Section de Moscou, Bulletin.
Sammlung kleiner Hallerischer Schriften. 1772.
Schedulae Orchidianae.
Secretaria de Educacion Publica Departamento de Antropologia, Mexico, Publicaciones.
Sociedad Cientifica del Paraguay, Revista.
Societas Zool. botanica Fennica Vanamo, Annales.
Societat de Biologia, Barcelona. Treballs.
Société des Amis des Sciences de Poznan, Bulletin, Series B.
Société Botanique de Lyon, Bulletin and Nouveaux Bulletin.
Société des Naturalistes Parisien, Bulletin.
Société de Pathologie Végétale, Bulletin.
Société Royale des Sciences et Belles Lettres de Nancy, Mémoires, v. 1–3 (1754–55).
Société des Sciences Naturelles de la Charente-Inférieure, Annales.
South Dakota Academy of Sciences, Proceedings.
Stanford University Publication, Geological Sciences.
Station Océanographique de Salammbo, Notes et Mémoires.
Tiflis Botanical Garden, Moniteur (du Jardin Botanique du Tiflis); and Scientific Papers of the Applied Section.
Towarzystwo Naukowe Warszawskie, Prace Instytutu im. M. Nenckiego; and Wydawicta monografje z Pracowni Neurobiologicjney.
Ukrainische Sevcenko-Gesellschaft der Wissenschaften in Lemberg, Sitzungsberichte der math.-naturw.-ärztlichen Sektion.
Universidad de Coimbra, Memorias e Estudios do Museu Zoologico.
Université de l'Asie Centrale, Bulletin.
University of Chicago, Abstract of Theses Humanistic Series.
University of Texas, Handbook Series.
Urania.
Vedrattan. Reykjavik.
Volcanic Letter.
Warbler (The).

Wiener Prähistorische Zeitschrift.
Zoologia Palaearctica.
Zoologische Vortraege. Leipzig, 1889–92.

The thanks and appreciation of the librarian are extended to Mr. William J. Fox for his efficient work as assistant librarian, and also for the valuable assistance given by Miss H. Newell Wardle.

SPENCER TROTTER,
Librarian.

Report of the Publication Committee

The volume of the PROCEEDINGS for 1925, now in press, will contain approximately 387 pages, with 11 plates. The YEAR BOOK for 1924, of 94 pages and 7 plates, was printed and distributed early in 1925. The publications of the American Entomological Society, usually noted in this report, will no doubt be referred to in the report of the entomological department. No part of the MANUAL OF CONCHOLOGY was issued since the last report.

WILLIAM J. FOX,
Secretary of the Committee.

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IMPRESSIONS OF ECUADOR

BY W. JUDSON COXEY.

Looking at a map of South America we observe just a little way down the West Coast bordering on the Pacific and sandwiched between Colombia and Peru, the Republic of Ecuador. Situated upon the equator and transversed by the lofty Andes this country has a most varied topography and climate. Geographically, Ecuador may roughly be divided into three regions and described as the *Costal*, the *Inter Andean*, which includes the East and West Cordilleras and high intermediary plateau, and finally the *Trans Andean*, which embraces the foothills of the east Cordilleras and the wooded area of the upper Amazon. The climate of Ecuador considering its size is one of extremes and greatly dependent upon altitude. Along the coast toward the Gulf of Guayaquil is a parched desert area rarely visited by rains. Along the Guayas River and the low valleys on both slopes of the Andes and in the low Amazon district it is hot and humid with abundant tropical vegetation, and excessive rainfall in the eastern portion. The central plateau is temperate. The Quito basin with an altitude of from six to eight thousand feet has a mean annual temperature of 66° Fahr.

The idea of a trip to the tropics of South America has always been of great interest to me. So last summer when I received a letter from my friend, Mr. A. F. Porter telling me some of his experiences collecting butterflies in Peru and asking me to join him in Ecuador in October, my longing crystalized into a definite plan and on the seventh of October I sailed from New York. The main object of this trip, aside from a never satisfied wanderlust, was to observe a new and strange flora and fauna and collect specimens of Lepidoptera for the Academy collection and also to see the sights and customs of a country as yet unexploited by tourists.

At sundown on the 17th we anchored off Salinas. The majestic Cape of Santa Elena is faintly visible through the gathering darkness, a huge mass of rock that is one of the salient points of the west coast of South America. A small tender took us part way to shore and then we were transferred into dugouts, each manned with two natives who quickly paddled to the shelving beach.

Salinas is the sea-shore resort of Guayaquil, the people patronizing the several hotels there when Guayaquil has its deluge of rain during January until April. Our visit being out of season we had the entire hotel to ourselves.

The country was arid with no vegetation except clumps of cactus. Birds were quite numerous. There were numbers of hawks, and one group of these birds were fighting over an object that they left in the road which proved to be a fairly large iguana. There were flocks of a small quail that scurried away along the ground at our approach. I saw no mammals, but I am told that to the north in the Colonche Hills, there are jaguars (*Felis onca*) and the little tigrello, or ocelot, (*Felis grisea*) is quite common. This smaller species is very often killed under the wheels of automobiles along this road, the glare of the headlights attracting it. As we drove along vegetation increased in the depressions and later the country became heavily wooded. Butterflies were becoming more and more plentiful. First I saw the yellows and skippers dodging along the roadside. And then my first blue butterfly (*Morpho pleiades*) and the sight of it took my breath away. It looked perfectly huge as it lazily flapped along flashing its blue wings in the sunlight. I saw many more of this species later at my camp at Dos Puentes but nothing will ever equal the thrill of seeing this first specimen, and none but a naturalist can understand how fully repaid I now felt for any trouble or expense incurred during my trip. A puncture halted the car a full hour, and a walk along the hot dusty road convinced me that the sun's rays here were considerably hotter than I had been accustomed to. A large tree nearby was completely covered with red blossoms around which were flying a number of humming birds of several species. The nickeled radiator of the automobile flashing in the sun attracted some blue Morphos. I caught one with my fingers as it hovered over the hood for an

UPPER.—Chimborazo from Riobamba.
LOWER.—Cotopaxi from Latacunga.

instant. There were numbers of solitary ceiba trees the fluffy down of which, known commercially as "Kapok," is used for mattress and upholstery stuffing, and is a valuable export from Ecuador. The large trunks of these trees, some of them eight feet in diameter, are swollen so in the middle that with their thick misshapen branches and gray bark they look like so many elephants standing erect.

We passed through several Indian villages. The thatched huts were elevated on pilings ten feet above the ground, indicating the flooded condition of this country during the rains, for we were now away from the arid coast and nearing the basin of the Guayas River. The largest town hereabouts is Chongon, consisting of about sixty huts and shacks built about a large church of unpainted wood. A bare dusty square is in front of the church. In the center of this space is a concrete pedestal upon which is a sculptured stone monkey, a relic of the pre-Inca low country Indians. We stopped at a little store kept by an Indian woman to purchase charged water. To describe the filth about this place would be indecent. Some food on the counter was exposed to swarms of flies while pigs, chickens, and naked children, roamed about at will. These Ecuador chickens, which seem to be the principal article of diet, are mostly of a breed that were to me particularly repulsive due to the resemblance about the head and neck to a turkey buzzard.

Passing through the wooden covered bridge over the Estero Salado and along the splendidly paved Boulevard 9 de Octubre we skirted around the park with its beautiful monument and tropical plants.

The city of Guayaquil on the banks of the navigable Guayas River is the largest commercial city of Ecuador and has approximately one hundred and twenty thousand inhabitants. As recently as 1912 Guayaquil was one of the pest holes of the earth. Yellow fever and bubonic plague were epidemic and death took a very heavy toll. This condition has been entirely changed, however, due to the Rockefeller Foundation through whose efforts yellow fever has entirely disappeared and sanitary conditions have been very greatly improved. During the rainy season the city suffers from malaria on account of the flooded condition of the low surrounding country.

Through the kind assistance of the American Consul, Mr. Clum, my baggage was quickly passed through the customs. Mr. Porter had been waiting a week for me in Guayaquil and on the twentieth of October we left the city early in the morning and crossed the Guayas River to Duran. The ferry boat is an old wooden side wheeler using wood for fuel and was crowded with a motley group of passengers. There were Indians, peons, several high-hatted officials, and a sprinkling of officers and soldiers in uniform. The air inside being a bit more than stuffy we went to the deck above. Even here it was hot and close but we were outdoors. The river at this point is all of a mile wide and smells of rotting wood and worse. The morning mist was still lingering about the shores but the peculiar looking sugar loaf hills back of the city were plainly visible in the distance. Pelicans and gulls were flying about and an occasional man-of-war bird soared high above. The current of the river was very strong, tide water running rapidly six hours each way, up and down. The natives take advantage of this and much freight is moved on rafts of balsa wood.

At Duran are the railroad shops, terminal station and docks of the Guayaquil and Quito Railroad. There is also a hotel and a few houses. The tri-weekly train departs from here at 6:30 A. M. to Quito, a distance of 465 miles, the night being usually spent in Riobamba.

The first fifty miles of the railroad journey is through level country cultivated for the greater part. We passed banana groves, meadows with grazing cattle, plantations of cacao, coffee, and many kinds of tropical fruits. Sugar cane is extensively grown here and up to eight thousand feet elevation. There are a number of old villages, Yaguachi, Milagro, and Naranjito, with rows of bamboo houses lining the hot dusty streets.

The end of the flat country is reached at Bucay where the railroad now starts to climb the Andes, fighting its way up an almost continuous grade of five and one-half per cent, following the winding bed of the Chanchan River to Palmira, seventy-nine miles distant. The train is cut down to four cars and is pulled up the steep grades by sturdy Baldwin, Philadelphia built, oil-burning locomotives. The bed of the river is continually changing and each rainy season

washes down tons of soft volcanic rock turning the dry river bed into a raging torrent that very often washes away large sections of the railroad. These slides and wash-outs make the maintenance of the roadway a very expensive operation and requires constant attention. An attempt to control these destructive forces is being made by the erection of walls of masonry at threatened points. We were still going through thick tropical vegetation and climbing always up and up, winding around perpendicular walls, and continually crossing and recrossing the river bed.

The train stopped at Naranjapata where the engine took water. Our car was alongside a steep bank that was covered with fresh green maiden-hair ferns over which was hovering a beautiful butterfly *Heliconius cyrbia*. The insect is peculiar to this locality and we watched it with great interest as it flew by on flashing wings of blue, red and white—a delicate lovely thing

This locality is in the rain belt where rainfall occurs nearly every day throughout the year and even on a sunny day the tops of the mountains are obscured by banks of heavy clouds that continually saturate the forest with moisture. After a while the limit of these rain clouds was reached, a definite line of demarcation in a narrow valley. The sun now shone brightly from the clearest of blue skies and the soft brown mountains were bare excepting an occasional patch of brush and cactus. The air was cool and bracing and by mid-day we reached Huigra at an elevation of four thousand feet above sea level.

At Huigra our host was Mr. Edward Morley, a cultured Englishman who has lived in Ecuador a number of years. He has seen the construction period of the railroad and witnessed several revolutions. In addition to running the Hotel Huigra he operates several haciendas on his extensive land holdings. He is one of those rare individuals who is known and liked by everyone and who revels in human companionship.

We walked part way up a mountain to a little stretch of cultivated ground in search of butterflies but what few were there were quickly blown far out of reach by the cold wind that swept over the parched vegetation. Seeing our disappointment over the collecting prospect our host kindly offered us the use of his hacienda at Dos Puentes, located down the mountain a little past Naranjapata, where the collecting promised to be good.

On October 21, we started down the mountain again and arrived at Dos Puentes, meaning two bridges. Our camp here was about 1850 feet elevation. The country was very rough and hilly. On either side of the Chanchan River grew a thick tropical jungle consisting of a number of species of palms, balsa and various tropical hardwoods, all covered with creepers and some air plants. The underbrush at places was a thick mass of bamboo. There were several paths through the forests but a walk of a few miles along one of these was an exhausting climb up and down very steep slopes. The dry season was just coming to a close and insects were not common. Dry season here means plenty of clouds and gentle rains but not the torrential rains that start in January and continue for five months.

At six o'clock it begins to get dark so I set up the screen and lighted my thousand candlepower carbide lamp in order to attract moths. The illuminated sheet faced an open space clear two hundred feet across the river to the jungle. Very few moths came to the light the first night and what we did get were small. The light was kept burning until after midnight but there was hardly anything flying after ten o'clock. The temperature during the day averaged eighty-five degrees and sixty-five degrees at night so that we were always able to sleep.

Our tent was pitched on a small elevation at the edge of a banana grove back of which the mountain rose in a perpendicular wall. My favorite collecting spot was along a small trail that worked its way up the face of this wall. I would nearly always get a few skippers in the sunny spots and at a certain flowering bush there were sure to be several black butterflies, *Papilio* sp., hovering about. Occasionally a large blue butterfly, *Morpho pleiades*, would fly by but as a rule I did not attempt to catch it. These butterflies have an apparently slow, lazy flight, but if you try to get one it simply is not where your net strikes and you see your coveted prize give a flap or two of its wings that carries it across a deep canyon, requiring hours of the hardest work for the collector to climb down and up.

Large flocks of green parrots often flew over the camp high in the air, screaming at the top of their lungs. These birds make such a noise that sometimes on a dull day they may be plainly heard even though out of sight behind the low hanging clouds.

UPPER.—Street Scene on Indian Market Day, Riobamba.
LOWER.—Chanchan River from Camp at Dos Puentes, End of Dry Season.

The jaguar (*Felis onca*) is not uncommon in the jungle a few miles back from camp but rarely comes near the railroad line. One night we heard a jaguar scream and the following day the peons working here for our host saw the tracks of the huge cat where it had stood and surveyed the sleeping camp. One of these animals sometimes follows a man along a trail well out of sight only to quickly disappear in the thick underbrush when the unsuspecting traveller retraces his steps, leaving only the tell tale prints of its large paws. Due to the difficulty in tracking these animals during the daytime a dynamite trap is very often resorted to in order to destroy a jaguar that has been bold enough to kill cattle.

Drinking water may be safely had almost anywhere in the forest from cool, crystal springs that gush out of the mountain sides. The Chanchan River is not fit to drink or even bathe in. It is full of sulphur and impurities, in consequence of which there are no fish to speak of.

My native boy, Alberto, would often catch a very interesting beetle that flew early in the evening just after dark. These beetles belonging to the genus *Pyrophorus* are slightly over an inch in length and have two spots on either side of the elytra that emit a greenish white phosphorescent light. The glow from these spots is bright and steady and not like the flash of our firefly. The first specimen I saw startled me considerably, it was flying several feet off the ground and looked as though someone with a torch was hurrying along through the banana grove.

Beetles were scarce. My time was mostly occupied with butterflies but I always picked up a beetle when I saw one and sometimes would look about some rotting tree stumps back of the camp but my search there was never successful. It was here however that I saw a large snake, probably of the boa family. It was fully twelve feet long and carried its head well off the ground as it swiftly slid into the brush. This was the only snake I saw while at DosPuentes although every one said there were plenty of the deadly "ecce" to be found along the dry river bed. This reptile belongs to the genus *Lachesis*, allied to the deadly fer-de-lance. Fortunately I did not run across any of them but I did hear all sorts of fantastic tales about the fatal cases of persons who had been bitten.

Walking along the railroad track as far as Naranjapata usually yielded a few good butterflies. At a banana grove I would sometimes see some "owl butterflies," *Caligo bellerophon*, with spots on the under side of the wings like the eyes of an owl. By the station the company had diverted a swift mountain stream through a flume over the track, and by adjusting a pipe the locomotive feed tank could be quickly filled with water. There was considerable moisture about this place that attracted some fine butterflies, and I would often get a good specimen of *Callicore* or *Prepona* sipping at the damp sand.

About a mile further on was a little waterfall. Here is where I saw most of the blue Morphos. They were not there in numbers but would come singly and linger a moment as if seeking refreshment among the bedewed ferns and bamboos. I used to sit on a rock in the shade and listen to the soft murmur of the water and watch for these butterflies. After waiting patiently for a few minutes there would be an iridescent blue flash—but nearly always far beyond the reach of my net.

Back in the forest one day I spied a beautiful trogon, *Pharomacrus antisiensis*, perched silently on a bough deep in the shadows. This bird allowed me to approach within a few feet and closely observe its glittering emerald feathers and crimsoned breast. On two other occasions I noted solitary specimens of this gorgeous bird but they were always back in the forest.

One afternoon I noticed a flock of what I first thought were hawks flying through the valley. There were fully fifteen birds that circled about for a half hour alighting sometimes on the tallest trees. By their coloring of black and white and long forked tail feathers I finally recognized them as the Swallow-tailed Kite, *Elanoides forficatus*. I did not see this species again.

While in the mountains I was continually on the lookout for the condor, *Sarcorhamphus gryphus*, but never saw one. This huge bird which is the national emblem of Ecuador is only found in the high altitudes of the Andes. Edward Morley told me he captured a condor on a mountain above Huigra at an elevation of eight thousand feet, but they are seldom if ever found below that altitude.

Some days here at camp the rain would continue nearly all day, not exactly a rain either but more of a drizzle and called locally

a "garua." During this light rain which was not at all unpleasant to me, I used to collect specimens by beating the bushes and would catch the insects as they flew up. Of course the Morphos and sun loving butterflies were not on the wing but back in the forest, along my favorite jungle path in the semi-darkness, the long winged clear-wings, Ithomiinae, flit about even during the rain.

Every day the peons would bring me back an insect or plant. Sometimes it would be an orchid with long sprays of yellow blossoms. One of the men proudly handed me something wrapped in a leaf which proved to be a large moth (*Automeris* sp.). A beautiful thing but alas torn to shreds; it had been scared up while the brush was being cleared and repeatedly knocked at with the machete of the zealous peon who was so enthusiastic about his capture that I did not have the heart to disillusion him but graciously accepted his offering and gave him a paper sucre.

When I was in Huigra I often would look out of my window at the mountains that shut us in all about and towered six thousand feet above the town. Although bare looking I knew there must be butterflies in the sheltered canyons and I wanted to collect up there. My host very generously furnished me with men and horses to make the trip to one of his haciandas near the top of the mountain directly in front of the hotel. By eight o'clock in the morning everything was in readiness for the trip. My mule was a spirited animal that took off at a brisk gallop. I was worried for fear of displaying my ignorance of horsemanship to the crowd of natives lounging about the hotel, but I managed to stay on my mount in a more or less graceful manner in spite of holding a butterfly net in one hand my heavy graflex camera in the other. The road led up a very steep grade that trailed back and forth across the face of a grassy slope. Some of the canyons had small streams of water in their depths that swiftly rushed on their way to irrigate cane fields below. In these places the vegetation was very thick. The trees were loaded down with huge lichens and mosses, air plants and an occasional orchid.

As we went farther up the mountain the trees become smaller and more thickly covered with parasites. The trail was very steep and at places worn like the steps of a stairway. When the mule made the turns my leg swung out over space and I could

look down and see the tiny tin roofs of Huigra two thousand feet below. After two hours of continuous climbing we arrived at the summit seven thousand feet above sea level with peaks all around us up to ten thousand feet. Here we found a picturesquely dressed Indian family living in a thatched hut perched on the mountain top. From here the view is glorious, range upon range of the Andes spread out in pamorama, visible for miles until in the afternoon wisps of fleecy clouds gather and we are in a dense fog. Even in this cold drizzle I caught a number of butterflies Satyridae, by beating the dead brush along the trail.

The following day a similar trip was taken to a hacienda high upon a nearby mountain. On this trip we passed through a particularly beautiful canyon. Graceful sprays of bamboo hung down and swept the swiftly moving stream. At the bridge we were obliged to dismount and lead the horses across the rotting structure as every other plank in the floor was missing. Flying about the damp sand at the crossing were clouds of butterflies, yellow *Colias* and orange *Terias*.

The farm on the top of the mountain was very extensive and well equipped. The house was large and comfortable with light airy rooms and a large second story porch from which one could look miles up the valley of the Chanchan River. Back of the house we saw a cane mill that had hydraulically operated crushing machinery. The cane juice is allowed to ferment in huge hogheads and then run through the copper stills. The liquor when properly aged in wood is a deep straw color. Our two hosts were huge men all of six feet tall and just as charming as they were large. They insisted that Morley and I stay and join them at their mid-day meal; this proved to be a deliciously cooked dinner served in many courses in true Ecuadorean style. A trip about the farm was made in the afternoon. There in well-irrigated fields we saw large white potato plants, one of which was pulled at random, and yielded fully a half-bushel of fine tubers. Sugar cane and oranges also grow well here in the clouds at an altitude of six thousand feet, but the amazing productiveness of the soil was most impressed upon me when they assured me that eight crops of alfalfa are cut yearly.

I enjoyed the very great privilege of coasting down the mountains

in a small gravity car through the kindness of Mr. William Jackson of the Guayaquil and Quito Railroad. Starting from Huigra we took the noon train to Palmira. Here we got on a small car and rode down the steep grades back to Huigra, a distance of thirty-one miles and a drop in altitude of sixty-six hundred feet. This was a most thrilling ride, coasting all the way with nothing between us and eternity but a hand brake. The scenery was magnificent. Although late in the afternoon the light was still strong and the color effects of soft tan, brown, and mauve in the fading daylight were superb. Each time we rounded a curve, and the road was nothing but curves, a new and ever changing vista of mountain ranges appeared. At the high bridge the car was stopped and I went down to the dry bed of the river to get a photograph. The climb back to the track was made with the utmost difficulty due to shortness of breath on account of the high altitude. At the "Devil's Nose" the railroad descends the face of a sharply pointed mountain of solid rock. The track makes two zig-zags or switchbacks in order to reach the valley. Here is where a junction is made with the Cuenca Railroad, now under construction.

While at Huigra I witnessed a most primitive method of sawing boards from the log. There is no equipment to speak of, everything is done by manual labor. The log to be sawed has already been roughly squared where it was felled in a nearby forest. It is now carefully marked for sawing into thin boards and then set up on a high trestle by the two workmen. Each man grasps the end of a long saw, one on the trestle and the other man standing on the ground. This seemed like a very expensive method of production until one takes into account the cheapness of labor here, about thirty cents a day per man. Morley assured me the men turned out a surprising number of boards in a day's work.

Huigra has an ideal climate. Situated far above the hot lowlands but not high enough to cause one the inconvenience of the higher altitudes. The hotel is comfortable and I regret that I was unable to stay there longer in the sunlight and enjoy the clear bracing air. Edward Morley has a little room adjacent to the hotel lobby and I have the most pleasant recollections of many informal gatherings with our charming host, J. F. White and William Jackson.

The ride to Riobamba is not without interest. From Palmira

we traveled over the comparatively level high plateau. This is mostly a waste of black volcanic sand devoid of vegetation. At places the surface is rippled like a sandy beach when the tide recedes. The vast desolation and weird unreality of the region brought to mind the pictures of Gustave Doré. Late in the afternoon the scene changed, the country became more broken. Small towns appeared and green fields under irrigation were scattered about. Presently through a gap in the range a glimpse is seen of the blue white icy dome of mighty Chimborazo, the largest mountain in Ecuador. As we approach Riobamba we go through long lanes of eucalyptus trees; these trees were imported from Australia and are practically the only tree growing here. The pleasantly pungent smell of these gums is quite noticeable. Alongside the track is a small swiftly running stream that flows eastward and becomes a tributary of the mighty Amazon. This water moistens the parched earth and turns the little valley into a vista of green loveliness. Clumps of blooming calla lilies grow abundantly in this meadow. The houses had changed from the bamboo and thatched roof construction of the lowlands to sturdy dwellings with thick white-washed adobe walls roofed with aged red tiles. All about were walls of adobe topped with growing cactus that separated the tiny farms.

The city of Riobamba is laid out with severely straight cobbled streets at right angles, but several parks ablaze with flowers and tropical vegetation relieve this monotony. We were invited to stop with Dr. and Mrs. Rorer for the few days we were staying here. The Rorer's house which they call "Hacienda Trinidad" is situated on a height of ground slightly beyond the limits of the city. As you pass through the tall gates and enter the grounds you see the comfortable low rambling dwelling of Spanish architecture in a grove of lofty eucalyptus trees. The rugged frosted tips of the volcano El Altar are just visible above the trees, and from the front of the house and over the red roofed city the cold icy face of Chimborazo looms in the background, a huge mass dominating everything.

The days are chilly notwithstanding the brilliant sunshine, and the nights are cold. There were ice crystals on the alfalfa in the morning as evidence of a severe frost during the night. Flowers

were blooming everywhere but butterflies conspicuously absent. However a day's journey down the east slope to one of the humid valleys would no doubt yield many insects.

Mrs. Rorer has an extensive collection of Ecuador Lepidoptera and many of the specimens she collected herself, except those from the Oriente which were taken by Enrique Feyer.

Riobamba is the center of a large Indian population. Every Saturday the Indians in considerable numbers trudge to town, some of them many miles, to congregate on several open squares in the city and display their wares for sale and barter. They offer woolen and cotton ponchos and all manner of native grains and fruits. They dress in brightly hued ponchos, reds and orange predominating, and present a very colorful spectacle.

Leaving Riobamba after a delightful visit we took the train for Quito. As we climbed along the plateau and out again in the open country three snow capped mountains reared their peaks above the barren landscape. Of course Chimborazo rising 20,498 feet above sea level was the most noticeable. It had snowed on this mountain in the morning and the fresh white mantle extended far down its glacial ribbed sides. El Altar, 17,730 feet elevation, was also more plainly seen here than at Riobamba. This mountain rises to a ragged circular edge, the rim tipped with snow. The central cone is gone, supposed to have been blown away during a violent eruption years ago. The other volcano is Tungurahua, 16690 feet high, at whose foot nestles the town of Baños the principal gateway to the Oriente. This was the only volcano showing activity. In spite of a rather large snow cap there was a column of steam and smoke issuing from the crater.

After nightfall it was pitch dark outside and when I went out on the rear platform for a breath of fresh air, the full moon was just rising over the mountain range flooding the entire valley with a soft radiance and in the distance the form of Cotopaxi was outlined against the dark sky, turned by the moonlight into a cone of gleaming silver.

Quito the capital of Ecuador is beautifully situated among the mountains at an altitude of 9000 feet and enjoyes a climate of perpetual spring. This city was founded by the intrepid Spanish conqueror, Sebastian de Benalcazar, on the side of the extinct

volcano Pichincha. The cathedral and many beautiful churches and old Spanish colonial houses preserve the atmosphere of antiquity even though the smoothly paved streets have an abundance of automobiles and are brilliantly lighted at night. On the principal Plaza are located the extensive government buildings and the beautiful cathedral.

The cathedral is the Jesuit church, a structure monumental in size with exquisite architectural detail. The interior beggars description, the soft light falls upon dull gold everywhere. The entire interior of intricate carvings is covered with gold leaf—a kings ransom. There are many jewels and rich old tapestries but the main color note is yellow gold. Quite likely a great portion of this metal was originally panned from the interior rivers by thousands of slaves for their Inca king, later to be despoiled by the Spanish conquerors, and used in turn to adorn their temple.

An early start from Quito was made in the bright morning sunlight. About seventy miles south of the city the country becomes a veritable desert, the ranges to the right and left are parched and brown and even the few scrub trees in the canyons seem to be dying of thirst.

Several times the railroad crosses the substantial highway built years ago by Garcia Moreno, and the stone bridges have been so well built that they do not show the many years of neglect.

At Latacunga where we got off the train to lunch at the little station restaurant, snow clad Cotopaxi seems almost sheer above us. The symmetry of this beautiful volcano is hardly equaled anywhere in the world. In a nearby meadow there were hundreds of yellow butterflies, *Colias*, flying about but unfortunately my nets were all packed with my baggage.

On the broad plain near Latacunga is a large conical hill plainly seen from the car window. There can be no doubt of its artificial construction and legend has it that some of the alleged Inca treasure is buried therein. This is hardly likely however as the marauding Spaniards plundered this country in too thorough and systematic a manner to have overlooked such an obvious hiding place.

Occasionally on the bare hillsides of the highest passes I noticed a little stemless white flower slightly larger than a daisy. This

plant *Werneria* clung tightly to the hard baked earth and smiled bravely upward even in the face of the cold blasts sweeping down from the glaciers.

Returning to Guayaquil I stopped several days at Bucay at the foot of the western Andes. Near here is the junction of the Chinchin and Chimbo Rivers. During my stay here I was generously given a room at the railroad company quarters.

The climate is hot here and it rains nearly every day. I collected on a path that ran along the side and up the Chimbo River. The weather was mostly cloudy during my short stay but during the few intervals of sunshine about thirty species of butterflies were flying abundantly. Hummingbirds were darting through the air everywhere shrilly squeaking. One morning I secured a large moth *Arsenura* that was hanging on the wire screening of the upper porch of the station.

On the second day of December I was back in Guayaquil waiting a few days for my steamer to sail north. It was necessary to change boats at Cristobal and I was anxious to make connections there and reach home before Christmas.

My insect collecting in Ecuador was made at the end of the dry season. I worked at four points along the line of the Guayaquil and Quito Railroad on the slopes of the Western Cordilleras. These localities were, Bucay 975 feet, Naranjapata 1850 feet, Huigra 4000 feet, and on a mountain above Huigra 7000 feet. During a period of four weeks I collected at these places approximately twenty-five hundred specimens of Lepidoptera that I have deposited in the Academy collection for mounting and determination. In addition to these insects about fifty orchid plants were gathered from Mr. Morley's haciendas at Dos Puentes and above Huigra and given to Princeton University.

In conclusion I wish to express my appreciation and thanks to the following people for their many courtesies: Mr. Howard Clum, American Consul at Guayaquil; Mr. W. C. Graham, British Consul at Guayaquil; Mr. J. C. Dobbie, President and Mr. J. F. White, Assistant to the President of the Guayaquil and Quito Railroad; Dr. and Mrs. Rorer; Mr. Edward Morley; Mr. William Jackson; Mr. Adriano Cobo; Mr. Ramon Gallegos and Dr. Herman B. Parker. Also I particularly wish to mention the conductors and

firemen on the Guayaquil and Quito Railroad and a host of kind Ecuador friends who lent me every possible assistance.

THE STUDY COLLECTION OF WATER FOWL

BY WITMER STONE.

The accounts of early voyagers and settlers on the Atlantic Coast of North America frequently mention the great abundance of water fowl which thronged the bays and sounds. Unfortunately no effort was made to estimate their numbers either then or in much later times, so that we have no means of making definite comparisons. While their numbers have undoubtedly been steadily decreasing as years went by and the settlement of the country advanced, it has only been in very recent times that the question of their possible extermination has been seriously considered.

The Labrador Duck, never abundant within the time of ornithological record, is known to have disappeared entirely by 1872 and today but 42 specimens are extant in museums or private collections. The Trumpeter Swan, our largest water fowl, also has become steadily less in numbers until today it is represented by only a few individuals in the mountain lakes of British Columbia, where every effort is being made by the Canadian Government to save it from extinction. In museums it is even rarer than the Labrador Duck. These are, however, special cases and due doubtless to special causes.

The decrease in the numbers of the Wood Duck or Summer Duck, a more familiar species, has attracted much attention as it is probably the showiest of all our wild fowl, and as early as 1901 it was cited by the U. S. Biological Survey as a "vanishing game bird." Unfortunately its breeding range is largely in the Southern and Middle States and it was not only disturbed by the spring shooting but has been open to slaughter throughout the year by the pot hunters and the lawless native hunters, while other ducks departed to the north to breed beyond the range of persecution. Such Black Ducks as formerly nested along our Middle Atlantic Coast suffered in the same way, but the abolition of spring shooting has brought the Black Duck back as a breeding bird along our New Jersey

Photo by E. A. McIlhenny Courtesy of 'The Auk'

MALLARDS AND PINTAILS IN THE AIR, NEAR CHENIER, LA.

Photo by E. A. McIlhenny Courtesy of 'The Auk'

MALLARDS RISING FROM WATER, NEAR CHENIER, LA.

Coast, while its existence as a species was never threatened, since the bulk of the individuals bred in safety farther north.

With the rapid settlement of the Middle West and the conversion of miles of open marsh land into great wheat fields, the ducks were soon forced back from former breeding grounds in Iowa, Minnesota and the Dakotas; and more recently as the railroads have pushed northward through Saskatchewan, the center of their nesting area has been threatened.

Coincident with this the number of duck hunters in the winter range of the bird has presented a steady increase year by year, and the protection of the wild fowl became a serious and immediate problem. The result was the adoption of the migratory bird treaty between the United States and Canada and the abolition of all spring shooting. The results were apparent almost at once and ducks increased on their winter feeding grounds along the Atlantic Coast and the lower Mississippi Valley until they were reported more plentiful than at any time within the memory of present day sportsmen.

Unfortunately at this time there developed a wide spread mania for draining swamps, marshes and shallow lakes, with the idea of adding to the areas of farmland or developing salable lots for resort purposes along our coasts, while certain lakes were sapped of their waters for irrigation purposes. Much of this effort was useless as the resulting land was unsuitable for the purposes for which it was hoped to use it, while in parts of the West great alkali flats have been produced covered with shallow water. The effect upon the ducks was marked. Those using the partly drained areas in the West were poisoned by the alkali while elsewhere the migrant flocks passed by regions where ponds or marshes formerly existed to seek feeding grounds elsewhere.

In the hope of providing necessary feeding grounds campaigns are in progress to establish reservations where the ducks may find a congenial environment and where duck shooting under proper restriction may be enjoyed. The public shooting ground bill, now pending in Congress, is a measure for this purpose. As is frequently the case difference of opinion has arisen among sportsmen and others as to the best method to be adopted in saving the ducks and controversies have been waged which only tend to disgust and bewilder

the law makers upon whose action the success of the movement largely depends. Some advocate reducing the bag limit but as a matter of fact those who shoot ducks legally rarely engage in the sport for more than a few days in a season. To further limit the bag would make their shooting hardly worth while and would tend to break up the clubs that wealthy duck shooters maintain; the grounds of which constitute reservations where ducks and all forms of wild life are protected in the closed season. Other complications are the claim in some quarters that feeding ducks on gunning club grounds concentrates them and makes the destruction greater. It has also been demonstrated that in such places ducks feeding on the bottom take into their stomach considerable shot that has accumulated through constant shooting and suffer from lead poisoning.

As is usual, however, the most serious menace is not the most obvious one, and in this case it is unquestionably the draining of ponds and marshes, and more ducks are destroyed annually by alkali poisoning than are killed by the gunners.

The problem of saving the ducks with ever shifting conditions is a complicated one, and it is impossible to forsee what may happen.

Realizing the situation Mr. Charles M. B. Cadwalader several years ago began collecting ducks for the Academy's museum with the idea of forming a reference series of skins which would be available for study and examination for all time by sportsmen, ornithologists and artists. He realized that the hundreds of ducks killed at the various clubs, after the sport of shooting was over, simply went to gratify the palates of the hunters and their friends, and he felt that if but a part of these could be properly prepared as study skins the proposed collection would soon be a reality.

This plan was put into operation with the result that the Academy has now a series of some 600 specimens of ducks and geese prepared in a manner to ensure their permanent preservation. The completed skin appears like a dead duck, lying on its back with neck extended and wings closed against the body. All of the fat and grease that could possibly be removed in skinning has been cut away or scraped off with wire brushes and the skin then submitted to a degreasing bath, which absorbed what remained. The great trouble with most museum specimens of water birds in the past has

Photo by The Detroit News

Courtesy of 'The Auk'

TWO PHOTOGRAPHS OF A FLOCK OF WHISTLING SWANS AT THE MOUTH OF THE DETROIT RIVER, SPRING, 1926

been that this grease eventually permeated the feathers, discoloring them and rotting the skin, so that many old specimens are almost worthless. All of the specimens have been carefully labelled with date, locality and sex—the last determined by actual dissection.

Incidentally it developed that the bodies of "skinned" ducks were almost as good eating as those with the skins on, so that there was usually no waste material whatever!

The work of preparing the specimens has been under the personal direction of Mr. Wharton Huber, Assistant Curator of Birds and Mammals, who has taken great pains to have them as perfect as possible.

While Mr. Cadwalader has contributed most of the specimens many of his friends and other members of the Academy have been induced to help and interesting and valuable specimens have been received from the following: R. Dale Benson, Jr., Richard E. Bishop, Clarence M. Clark, John Drayton, Charles S. Hebard, Morgan Hebard, W. G. Hopkins, E. C. Knight, Charles H. Newcomb, Wm. Howard Smith, Wm. Henry Trotter, Dr. Henry Tucker, Charles Wheeler, James D. Winsor, and William T. Wright. The collection now represents pretty well the winter plumages of the common species of the Atlantic coast and the usual variations due to sex and age are shown. There are however many peculiar individual variations unrepresented and additional specimens of some species as well as any specimens of rare or unusual ducks and geese will be most welcome.

It is hoped to send a collector to some of the breeding grounds of the ducks in the near future to secure, under special permit, representative specimens in the breeding plumage, as well as in the peculiar "eclipse" plumage which the males of many species assume during the molt of the flight feathers, and also specimens of the young.

Such specimens will be extremely interesting and will complete the plumage cycle of the various species.

Among the particularly interesting specimens now in the collection may be mentioned several European Widgeon, which differ markedly from the American Widgeon, or Baldpate, in having a rusty red head. The females of the two species are however so closely alike that they can only safely be distinguished by the

under wing feathers (axillaries) which are white in the American bird and streaked with dusky in the European. No females of the latter have yet been recorded in America. Mr. Cadwalader secured one at Waterlily, N. C., November 12, 1926, which was supposed to be a female until dissection showed it to be a young male, which had not yet acquired the rusty red head.

Another much rarer specimen obtained by Mr. Cadwalader at Waterlily, December 7, 1926, is a male European Teal which differs from the Green-winged Teal of America in the absence of the diagonal white bar across the shoulder. Stragglers of this species are much rarer in America than are those of the European Widgeon and there are only a very few records of its capture in this country.

Mr. E. C. Knight, among some Greater Snow Geese shot at Corolla, N. C., January 21, 1927, was fortunate enough to secure one Lesser Snow Goose, a bird rarely found east of the Mississippi Valley.

Still another rarety is a Blue Goose obtained by Mr. William T. Wright, a species of the central states which rarely occurs on the Atlantic Seaboard.

Several interesting ducks presented to the Academy before Mr. Cadwalader began the present collection will be added to it. Notable among these is a Cinnamon Teal obtained by Mr. Charles S. Hebard on Lake Samonia, Florida, February 18, 1893, the most eastern record known for this western species. A unique specimen is a beautiful hybrid between a Mallard and Green-winged Teal shot by the late Dr. Charles B. Penrose on Currituck Sound, N. C. in January, 1903.

With the continued aid of sportsmen interested in duck shooting this collection can in a short time be made practically complete, and even at the present time it is as fine a representation of American water fowl as can be found anywhere.

TO KANAB, THE KAIBAB AND BEYOND

BY JAMES A. G. REHN

In several of the previous issues of the Academy Year Book I have outlined briefly the comprehensive Orthoptera field reconnaissance work with which Mr. Morgan Hebard, now Curator of our Department of Entomology, and the writer have been engaged for a number of years, in the western United States. This survey has been and is being carried out along definite lines, and it is hardly necessary to repeat the explanatory remarks already made concerning the methods followed.

Briefly the work projected for, and completed during the proper season of 1926, consisted of an examination of the high plateau region of south-central Utah, certain of the adjacent high ranges in that state and nearby Nevada, the section of Arizona north of the Grand Canyon, and the Virgin River district of southern Nevada. Altitudinally the localities which were to be visited ranged from less than 1,700 to as much as 13,000 feet above the sea, and in character from extreme desert to the heaviest of fir forests.

As with almost all of the previous field work in connection with this survey, the entire cost of the season's operations was contributed by Mr. Hebard.

Leaving Philadelphia August 16, the evening of August 19 found us at the pleasant town of Beaver, Utah, a Mormon community nestled at the west foot of the towering Tushar Range. This was to be our base of operations, and the congenial companionship of Mr. W. W. Farrer, of Beaver, made the succeeding weeks pass all too quickly.

A short side trip was first made to the upper slopes of the Tushar Range, with several days in camp at Puffer Lake, at an elevation of 8,250 feet. Beaver lies at approximately 6,000 feet, at the upper edge of the Upper Sonoran life zone. Sage and shad-scale (*Atriplex*) are the dominant plant features of unaltered native landscape in Beaver Valley, although irrigation has changed much of the more level land along and near Beaver Creek into productive

ranches. Climbing Beaver Canyon one passes through gorges with much bull pine, and aspen along the stream course, while as the elevation increases firs become more in evidence, until the firs and aspens completely replace the pine, and the Canadian Zone is reached. Some meadowy flats are present, and in one of these a colony of Englehardt's Woodchuck, a cousin of our eastern ground-hog, disported themselves about the slab pile of a vanished saw-mill. Puffer Lake lies in a pocket toward which slope meadowy glades running up into heavy aspen and fir forest. Toward evening the usual mirror-like surface of the lake was constantly broken by jumping trout, which also gave variety to our camp fare.

From Puffer Lake we climbed upward through cold, dark forest, largely aspen on the more exposed ridges, and fir in the ravines, to the timber-line meadows at about 10,000 feet, where low but lush alpine vegetation furnished the environment so greatly preferred by the more truly alpine grasshoppers. Great masses of deep purplish-blue larkspur there furnished the dominant color tone of the plant cover. The west slope of Delano Peak towered above us to 12,240 feet, devoid of tree growth and largely patches of treacherous slide rock, the ideal home of the alpine pikas or little chief hares (*Ochotona*), which squeaked their strange ventriloquistic notes on every hand.

From the summit of Delano Peak the view was panoramic, the valley of the Sevier River being almost directly below us to the east, while the far eastern horizon held the outlines of the Henry Mountains. Westward we looked across range after range into eastern Nevada, and southward the far distant Beaver Dam and other ranges framed the picture. Although it was August twenty-first the howling gale on the summit was very cold and penetrating, and work in the lee was more productive and pleasant than on the wind-swept crest.

Our special objective in visiting the higher slopes of the Tushar Range was to secure additional material of a grasshopper described by the writer twenty years ago, from a single specimen taken in these mountains. In this we were eminently successful, securing the desired material and full notes, as well as other material and observations fully illustrating the Orthoptera found on the western

UPPER.—Stella Lake at North Foot of Mt. Wheeler, Snake Range, Nevada. Elevation at Viewpoint, 10,000 Feet.

LOWER.—Details of Erosion of Bryce Canyon, Paunsaugunt Plateau, Utah.

slope of the Tushar Range from 6,000 to 12,240 feet. As a whole, the Tushar Range zoologically and floristically, is very similar to the more northern Wasatch group, of which it is orographically a part.

Leaving Beaver again, but with our equipment and supplies stowed in a light truck piloted by Mr. Farrer, we headed westward on the first leg of our main trip. Mt. Wheeler, the highest peak in the Snake Range, and the greatest elevation in Nevada, was our first objective. It is but a few miles west of the Utah line, isolated from all railroads, but not far removed from a so-called "highway." In this direction the mountain ranges and the broad intervening valleys are typical of the Basin and Range Province (the Great Basin of authors), most of the mountains having no heavier tree cover than juniper and pinyon. The road crossed the broad Wah-wah Valley, the Wah-wah Range, Pine Valley (with no pines), rough red volcanic hills, the vast and dreary White Sage Valley, and finally Snake Valley, at the east foot of the Snake Range, was reached.

Lehman's Cave, a truly remarkable cavern in the eastern slope of the Snake Range, furnished us with headquarters, and from this point at 7,000 feet we went in the saddle to Lake Stella at 10,000 feet, where the horses were left and further work done on foot. The lower levels of the Snake Range are timbered with the usual juniper and pinyon, but soon a few bull pine, mountain mahogany, then aspen, spruce and fir follow in order, with a forest stand of density and size rarely seen in Nevada mountains. Lake Stella is but a few hundred feet below the timber-line, and immediately at the north foot of the peak of Mt. Wheeler, which towers above three thousand feet, a bifurcate summit, cleft in two by a gash several thousand feet deep, as though rent by a terrific convulsion of nature. Snow banks were scattered over the rock slides about the lake and a few grassy meadows there furnished a home for alpine species of grasshoppers, while a hardy argynnid butterfly fluttered about the slopes. The main peak of Mt. Wheeler was climbed by Mr. Hebard and Mr. Farrer, but yielded no Orthoptera not found on the slopes about Lake Stella, although it gave them a magnificent view. As we had done detailed field work in 1924 at Baker in the Snake Valley, and at Osceola Pass not more than

a dozen miles north of Mt. Wheeler, we were definitely connecting with the reconnaissance of previous seasons.

Leaving Lehman's Cave and swinging to the northeastward back into Utah, the sameness of the great Snake Valley gave way to the jumbled Confusion Range, from which at Cowboy Pass (5,700 feet) we looked down into the forbidding spectacle of White Valley, with its beds of white chalk. There was little in the way of Orthoptera to keep us in this ghostly basin, which seemed out of place in Utah and recalled vividly some parts of southern California, and the towering House or Antelope Range which bounds it on the east was much more productive and interesting. There in the limestone cliffs about our camp in Rainbow Canyon were many caves, both large and small, certain of which were clearly used by aboriginal man.

From the summit of the House Range (Marjum Pass 6,300 feet) eastward stretched Whirlwind Valley and the reaches of the northern Sevier Desert. The latter is one of the great basin areas of the Basin and Range Province, into which, after threading its way through several hundreds of miles of mountain valleys and gorges and turning sharply in its course, the Sevier River peacefully flows, to be evaporated in the sink of Sevier Lake. That this lake body was far more extensive than it is at present, is evidenced by the dead freshwater shells one may pick up miles away from the present margin of the water. Reclamation work is now utilizing most of the flow of the Sevier River and a considerable portion of the land of the Sevier Desert, and the section about the communities of Delta, Hinckley, Oasis and others is productive and prosperous.

Leaving the House Range and the Sevier Desert far behind, we next examined the country along the western base of the Pauvant Range, which is a more northern section of the same axial uplift as the Tushar Range. Here we were back again with more truly Rocky Mountain or Cordilleran types of animal and plant life, with the heavy forest cover reaching well down the slopes of the mountains, and numerous streams pouring down into the lower levels, which contain a number of the older Mormon communities, such as Fillmore. Certain of the stone "ranch forts" built by these hardy pioneers to protect themselves and their stock from Indian raids are still standing.

UPPER.—General View of Bryce Canyon, Eroded in East Face of Paunsaugunt Plateau, Utah.

LOWER.—From Rim of Paunsaugunt Plateau at Bryce Canyon, Looking Northeast toward the High Aquarius Plateau.

Going through the Pauvant Range by way of Clear Creek we were in the upper Sevier Valley, which there is a deep gorge, opening, as one travels southward upstream, into areas of level meadows. These flats have been largely cultivated, and here are more of the older Mormon towns.

But a few miles south of Panguitch one notices the reddish color of the eroded cliffs bordering the valley to the east. These are the western escarpment of one of the great plateaus which are the dominant structural features of south-central Utah. These vast plateaus, as there are roughly three levels of them, break off to the southward in step-like cliffs 2,000 or more feet high, their escarpments often fantastically eroded but more striking in their coloring. The more northern of these cliffs is a reddish to salmon pink, the central nearly whitish, the more southern deep red, and these colors have given them their names, the "Pink Cliffs," "the White Cliffs," and the "Vermilion Cliffs."

The plateau flanking the upper Sevier on the east is the Paunsaugunt, that on the west the Markagunt, while off to the east of the Paunsaugunt, and across a set of deeply eroded and intricate valleys, is the higher and more isolated Aquarius Plateau. To reach the rolling level of the Paunsaugunt Plateau from the west one climbs the fantastically eroded and brilliant colored Red Canyon, through groves of bull pine, and emerges on the largely open tableland, on which a low black sage is the main plant cover. The elevation is considerable, 7,750 to 8,200 feet, and the nights in August are very cool. Virtually nothing was known of the Orthoptera of these high plateaus, and our first day on them, on the Paunsaugunt, was a red-letter one. For a matter of seventeen years we had been endeavoring to secure fresh material and habitat notes on a genus and species of grasshopper taken on one of the government surveys, some fifty years ago, and which had been encountered but once since by any worker. It was our good fortune to observe and secure material of this exceedingly rare and little known insect, which is now in but one other collection in the world, although known to science for half a century. Its colors in life have been noted for the first time, as well as its actions and its plant association. While the game is smaller, one can feel the elation of the big game hunter in bagging a long-sought

trophy. With this we have also definite scientific knowledge on distribution, periodicity, structure, coloration and habits. Of course many other interesting species keep up the student's interest, but there is a Nimrod in all of us.

Bryce Canyon, that amphitheatre of endless and bizarre diversity, with its minarets and spires, its "toadstools" and chambered cliffs of salmon pink and pinkish white, is carved in the eastern escarpment of the Paunsaugunt Plateau. Bewildering in its complexity and yet at times with a lace-like delicacy to its tracery, Bryce Canyon must be seen to be appreciated. It is to the naturalist one of the most remarkable and striking pieces of erosion to be found, and to the visitor in search of the unusual in nature it is entrancing. The open bull pine woods back from the edge of Bryce Canyon, and in which we camped one night, yielded us several species of previously unknown flightless grasshoppers, belonging to a group highly developed in mountain areas and often very circumscribed in their specific distribution. Groups of this character are of the greatest value in endeavoring to trace how and whence the present life of these regions was derived.

The Markagunt Plateau averages higher than the Paunsaugunt, reaching up to 10,400 feet, or virtually timber-line, while much of the surface is over 9,000 feet. It is more rolling and broken than the Paunsaugunt, and largely timbered with aspen, spruce and fir, with open glades, and at the higher levels with grassy Hudsonian Zone meadows, in which swarmed a distinctly northern type of grasshopper, which is found as far north as Labrador. The sage areas of the Paunsaugunt are absent, and one soon realizes he is in a colder land.

The night of August 30 at 10,000 feet on the Markagunt Plateau was our coldest night, with ice in our wash basin, and frosted leaves on the shrubbery showed that summer was past at this level. Cedar Breaks, an equally impressive but less remarkable duplicate of Bryce Canyon, is cut in the western escarpment of the Markagunt Plateau, which there breaks off in a few miles of air-line distance from 10,400 feet to approximately 5,000 feet at the western foot. Cedar Breaks has less of the wonderful coloring and its erosion is by no means as complicated or as bizarre as Bryce Canyon. The view from the rim, however, is as fine in

scope but very different, reaching westward across the far lower Escalante Plain with its scattered ranges, and southwestward to the higher ranges of the Virgin River country, the "Dixie" of the native Utahan.

From the high Markagunt Plateau and the head-streams of the Sevier River we crossed the low divide into the upper reaches of Virgin River, then left the latter to climb another divide and follow down the valley of Kanab Creek, beneath the towering escarpments of the White Cliffs, and through broad areas of pink sand dunes. Here at approximately 5,500 feet it was much warmer than where we had been for some days. The sand dune belts, although isolated and surrounded by country of different type, were found to be inhabited by several species of grasshoppers virtually restricted to such environments elsewhere.

The old Mormon town of Kanab, for years one of the most isolated communities in the United States, is located along Kanab Creek where it emerges from the Vermilion Cliffs, which stretch off to the east and west for long distances, a great wall of deep reddish rock, here almost on the Utah-Arizona boundary line. As a boy Kanab and St. George always appealed to me, for on the maps they seemed to be the most out-of-the-way places in our country. To-day both are readily accessible by road, but Kanab still remains the threshold of a lonely land. Arizona north of the Grand Canyon of the Colorado, an area larger than a number of our eastern states, has few inhabitants, and Kanab is the natural center for this great territory of plains and plateaus, of open brush and dense forest.

Entering Arizona and leaving behind the little Mormon settlement of Fredonia, and the low sandstone ridge of the Shinarump Cliffs, we find a broad stretch of rolling plains, desert-like in parts and grassy in other sections, across which to the southward rise the escarpments of those great Arizona plateaus, the Kaibab and the Kanab, that southward rim the Grand Canyon on the north. These plateaus are great elevated areas with their surfaces rolling, the Kaibab covered with vast forests of bull pine, aspen and fir, the pine more limited to the marginal and lower sections, while natural grassy glades are scattered through the dense timber stands.

While the plains area about Fredonia averages from 4,500 to 5,000 feet above the sea, the surface of the Kaibab Plateau ranges from 6,700 to 9,000 feet, most of it being above 7,500 feet. The Fredonia plains with their lower elevation have been invaded by species of the warm desert areas to the west, the Colorado-Mohavan element, which probably by means of the avenue of the Colorado-Virgin River and its tributaries, has gradually spread over this relatively congenial territory. A number of the species of Orthoptera we found there were previously unknown from northern Arizona.

The temperature on the Fredonia plains was pleasant, while the Kaibab Plateau gave us a very real touch of cold, recalling the high Markagunt Plateau. The lower margin of the Kaibab escarpment is covered with the usual juniper and pinyon growth of similar elevations and slopes in this part of the country, as one ascends being replaced by a wonderfully beautiful forest of great bull pine. Here is the home of the magnificent white-tailed or Kaibab squirrel (*Sciurus kaibabensis*), and we were fortunate enough to see several of them bounding over the ground cover of dead pine needles. Certainly there is no more handsome small mammal in North America than this beautiful species, with its grey and black body, dull reddish back, tufted ears and plume-like white tail. Although a related species—Abert's squirrel—ranges from Colorado to northern Mexico, and is found on the southern margin of the Grand Canyon, the Kaibab squirrel is known only from the Kaibab and another nearby plateau. The effect of isolation and geographic barriers in the development of species is most strikingly emphasized in the presence of these two related but very distinct species, at localities virtually within sight of each other, living under otherwise identical conditions.

From the northern escarpment of the Kaibab Plateau the view back into Utah is really superb, the great step-like cliffs rising one behind the other, the Vermilion, the White and the far distant Pink, like the dais of some colossal throne, the broad plain below sweeping off to the west until lost in the distance.

It is hard to realize as one passes through mile after mile of dense fir forest with many aspen patches, that this rolling country is an Arizona plateau, so suggestive is it of land far to the north. The cold wind and the hint of snow in the air heightens the re-

semblance, while the open glades would not be out of place in Montana. In one of these glades we found a small colony of a genus of grasshoppers which is a distinctly northern type, and when found southward generally as a timber-line inhabitant.

This fir forest has probably the greatest deer population in the world, as by the virtual extermination of the larger predatory animals and added stocking, governmental agencies have increased the mule deer population to the point where it is now a serious question whether we shall have deer or forests. The young growth has been literally exterminated by the deer, and state authorities will not permit an exception being made to state game laws, which would allow a desired reduction in their numbers. The forest authorities are deeply concerned over the future of this piece of timber, covering roughly two thousand square miles, but conditions beyond their control make them powerless until the courts decide in whose hands, federal or state, is vested control of these deer on federal land, as plentiful as they are solely by federal action. We saw many deer, a number quite large bucks, and in the glades groups of four to eight were frequently encountered late in the day. Some were curious and hardly afraid, others bounded away promptly on sighting one, but all were thin and evidently there is a very real struggle for existence.

The north rim of the Grand Canyon of the Colorado on the Kaibab Plateau is distinctly higher (8,000–9,000 feet) than the more generally visited southern rim on the Coconino Plateau. The view is different, the river gorge being off to the south, with the various "temples" nearer at hand. Off across this marvel of erosion the surface of the Coconino Plateau seems as flat as the proverbial pancake, while hazy shapes on the far horizon mark the San Francisco Mountains group, Bill Williams Peak and other elevations. Seen in the late afternoon from Bright Angel Point on the Kaibab, the Canyon is the same impressive, mysterious, awe-inspiring chasm as from the better known view-point. No word picture can do it justice, can breathe its soul-gripping stupendousness or paint the glory of its red walls bathed in purplish-blue haze.

The Canyon rim, fortunately, had more in store for us than its wonderful view, as here we took the first Arizona specimens of

another northern grasshopper, while a hen and half-grown Franklin's Grouse scratching in the forest brush vividly recalled the north country.

Returning to Fredonia our route continued westward toward the Virgin River region, a land of more southern types, and the avenue through which more southern (austral) forms of life have reached into southwestern Utah and northern Arizona. From Fredonia westward stretch rolling plains at the foot of the Vermilion Cliffs, which here for a distance swell southward into Arizona, while on the south the escarpment of Kanab Plateau borders the lower land. The wind roared across this open country, while the dust-devils danced and swirled, and the protection of a low juniper and pinyon covered ridge was welcomed as a camp site. Morning showed us that unwittingly we had made camp at one of the numerous "petrified forests" found scattered over Arizona. However, few large logs were found, as frost evidently had accomplished much in the way of shattering these ancient timbers.

A few miles west of this point we were amazed to find a piece of grassland, which as far as many of its grasshoppers were concerned might have been a portion of the Great Plains of eastern Colorado. One of the interesting problems to be worked out in this connection is how the distinctly more eastern life of this area happened to be present in this isolated spot. The probability is that we have a relict or remnant of a more ancient fauna, akin to the grassland fauna of the Great Plains, now largely replaced over much of this country by types adapted to more arid conditions. Progressive aridity seems to be the climatic tendency of the region, and this undoubtedly means the replacing of forms requiring a relative degree of humidity and a grassland habitat, by those capable of enduring relative aridity, and adapted to the low bush cover now found in most of this country and that to the west and southwest of northern Arizona.

As we neared the Virgin River the whole country became more sterile and broken, benches and canyons, with high buttes, and lava flows, the Vermilion Cliffs for a long distance flanking us to the north. Utah was reëntered and finally the great cliff of Hurricane Ledge yawned beneath us, with the little town of Hurricane, the first real community seen since leaving Fredonia,

sixty miles to the east, nestled in its vineyards and orchards a thousand feet below at the foot of the escarpment. Hurricane Ledge reaches north and south for a great distance in this portion of Utah and Arizona, and its face is in many places almost sheer. Handling an auto-truck over the few switch-back roads which cross it is a difficult matter, and we breathed more easily when we looked back at the cliff.

The Virgin River country, the "Dixie" of the loyal son of Utah, is a land where lower elevations, warm sun and mild winters make it possible to raise many kinds of delicious grapes, melons, peaches, apricots, almonds, and even figs and pomegranates. No railroad as yet taps this fertile and productive river valley, and in consequence the market for its varied products is limited. The development of good roads, however, has helped greatly, and the fame of Hurricane grapes has spread over much of central Utah.

At La Verkin, which is apparently an Anglo-Saxon rendition of the pronunciation of the Spanish name "La Virgin," for the river, we saw the first stand of the creosote bush (*Covillea*), the dominant and characteristic shrub of the Lower Sonoran Life Zone. The elevation here is but 2,750 feet, and the temperature was high, quite in keeping with the Lower Sonoran indications. The Virgin River has cut a sharp and narrow gorge through Hurricane Ledge, as it rushed away from its birth place in the Utah plateaus to join the mighty Colorado. Leaving the gorge at La Verkin we followed the Virgin River upstream, then swung off up the Mukuntuweap into Zion National Park.

The reason for the creation of Zion National Park is the great gorge cut in the red and white sandstones and shales of the Kolob Plateau. The narrow Mukuntuweap winds and twists under the shadows of the massive margining domes and battlemented walls, which tower as much as three thousand five hundred feet above the slender stream, shining white above, purple, red and mauve below. The scenic beauty of Zion Park makes it well worth visiting, yet its full impressiveness cannot be gained in any one view. It is necessary to analyze it piecemeal, and view it as detached parts of a whole.

The narrowness of the Mukuntuweap gorge, and its effect in

controlling light and temperature, has been responsible for a rather interesting reversal of the usual biotic conditions, which we noticed. On the top of one of the domes, pinyon trees were plainly visible, far below these grew bull pine, and below this in a rift of rock wall where sunlight could not readily penetrate and a rill of water gave steady moisture, was a marked patch of spruce or fir. The usual altitudinal distribution of these trees had been exactly reversed by the conditions of the unusual environment, the Upper Sonoran pinyon growing at a higher elevation than the Canadian spruce or fir.

Leaving Zion Park and passing the smiling and prosperous country about Toquerville, Washington and St. George, we swung up the valley of the Santa Clara River and into the Beaver Dam Mountains. The Utah section of the Virgin River, which we were leaving, had proved interesting in that we had added a number of the lower, hotland species to the Utah fauna, as previously these had never been taken northeast of southern Nevada, or even southern California and the adjacent quite low deserts of Arizona.

The tree yucca or "joshua tree" which reaches its optimum development in the Mohave Desert, has its last outposts in the Beaver Dam Mountains, being a dominant landscape feature on the west slope from 4,000 to 4,400 feet elevation. From the juniper and pinyons of the pass through the Beaver Dam Mountains the view westward and southward was panoramic, the Mormon Range directly west, the Virgin Range across the Virgin River to the south, and in the far distance the high Spring Range, with Charleston Peak, and the many chains north of this south Nevada landmark. The long western slopes of the Beaver Dam Range lead down again to the Virgin River, which has forced its way through a mountain barrier by cutting a gorge between the Beaver Dam and Virgin Ranges, its brick red waters reminiscent of their paint-pot in the Vermilion Cliffs. For some few miles in Arizona, the river then passes into Nevada, and the Mormon settlements of Mesquite and Bunkerville use its sediment-laden flow for irrigating vineyards, orchards and melon patches. The elevation there is low, about 1,200 feet, and the slopes and flats have a plant cover such as one finds in the Mohave Desert a hundred miles

away in California, while mesquite trees and clumps of arrow-wood fringe the river. The animal life is equally Mohavan, the creosote bush had its special and peculiar grasshopper with wonderful mother-of-pearl patches on it, and one after another we found the old friends of days past in the Mohave and Colorado Deserts. The temperature was properly in keeping and the contrast to that of but a few days previous very marked.

Our farthest point, which brought us virtually in touch with reconnaissance work of previous years, was the valley of Muddy River, a tributary of the Virgin coming down a hundred miles or so from the higher country to the north about the old mining town of Pioche. The lower Muddy Valley, where we worked, is quite low, very hot, partially cultivated but apparently being abandoned in places. The old town of St. Thomas is but a few miles away from the junction of the Virgin and the Muddy, and near it archaeological discoveries of considerable extent and importance have been made. These have been sufficient to show that the Muddy Valley was an aboriginal center of considerable extent.

At one point the Muddy River has cut quite a gorge in upturned stratas rich in vertebrate fossils, which would well repay careful investigation. Our limited time, however, did not permit of more than a cursory examination of the slopes, but this was sufficient to show the richness of the deposit.

From the Muddy Valley we returned to St. George, and by a more direct route to Beaver, examining en route a number of interesting environments, such as the Escalante Valley west of Cedar City, and the saline deposits of Parowan Valley. Between the Virgin River country and Beaver we crossed relatively high country of interesting character, the more eastern and montane life element being here in contact with the true Great Basin influence coming in from the west. On leaving the Virgin River district we promptly left behind the southwestern or Mohavan element, which is so important a factor in the plant and animal life of that valley.

Leaving Beaver on September 13th, we reached Philadelphia September 17th, after a very successful trip, rich in material secured, observations made, and with a broader knowledge of the distribution of life in one of the more out-of-the-way and unfrequented parts of the United States.

Report of the Secretary

It is with considerable pleasure that the Secretary is able to report constructive progress during the year 1926 in certain Academy operations coming under his supervision. As the first entire year during which the institution functioned under the reorganization effected in 1924 and 1925, it has been possible to see more clearly such minor operative adjustments as would facilitate smoother and more efficient operations, and make or plan to make the desired changes.

With the whole-hearted support of an interested and representative membership committee there has been a very considerable increase in Academy membership, the number formally added to our list by election during the year being two hundred and sixty-one, while a total of three hundred and fifty-eight persons were elected or nominated during 1926, the latter group being elected in the early part of 1927. This work is continuing, with results fully as satisfactory, testifying to a broader public interest in the Academy and its activities.

At the meeting of January 19, 1926, nominations were made in accordance with the By-Laws, and at the annual meeting in February the following were elected; President (T. Chalkley Palmer), Vice-President (Dr. Henry Skinner), Secretary (James A. G. Rehn), Treasurer (George Vaux, Jr.) and three members of the Board of Trustees one to serve an unexpired term of one year (John Ashhurst), one to serve an unexpired term of two years (Dr. Spencer Trotter), and two to serve three years (George L. Harrison and Frank J. Keeley).

It was with distinct regret that the Academy received and accepted the resignation of Owen Wister as a member of the Board of Trustees.

The Board of Trustees held four meetings during the year, i. e. February 23, May 11, October 15 and December 17. Among the actions taken by the Board of Trustees during the year were the reappointment of the appointive officers and scientific staff as of January 1, 1926, except as noted below, the reappointment of the Council as constituted the same date except for Mr. Keeley, who

as an elected member of the Board of Trustees desired to withdraw from the Council, the reappointment of the Finance Committee and of the Library Committee and the appointment of Mr. Harrison and Mr. Keeley, with the President, as members of the Executive Committee of the Board of Trustees. Mr. Morgan Hebard was appointed Curator of the Department of Entomology to succeed the late Dr. Henry Skinner; Dr. Thomas S. Stewart was appointed Special Curator of Microscopy, with supervision over the Academy instruments and collections now located in the room occupied by the Leidy Microscopical Club. Mr. W. Judson Coxey was also appointed a Research Associate in the Department of Entomology, and Miss Louise Knobel as Special Aid in the same department.

The Board of Trustees created a Membership Committee, with Charles M. B. Cadwalader as Chairman with power to select the other members of the Committee, to coöperate with the Secretary in increasing the membership of the Academy, and authorized the Secretary to proceed with the work of the membership campaign. The Board of Trustees also adopted regulations regarding the acceptance of specimens given conditionally, and authorized the creation of a petty cash account with the fiscal agent, limited in amount and drawable by the Secretary and Bursar.

The Council held eight stated meetings during the year: on January 5, February 2, March 2, April 6, May 4, October 5, November 2 and December 7. The Council reappointed James A. G. Rehn its Secretary, appointed the Publication Committee, with Morgan Hebard in place of Dr. Witmer Stone who wished to withdraw, reappointed William J. Fox as Editor, appointed the Apportionment Committee and the Committee on Nomination of Correspondents, approved the nominations for correspondents submitted by the latter committee, approved the nomination of Dr. William B. Scott by the Committee on the Hayden Memorial Geological Award as the recipient of the nineteenth award, and took action on various other matters within the province of the Council.

During the year eight stated Academy meetings and adjourned meetings of the same and one special meeting have been held. These were on January 19, February 16, March 16, April 13

(special), April 20, May 18, June 8, November 16 and December 21. The attendance at these meetings ranged from seventeen to sixty-nine. The average attendance of members at all meetings was twenty-two, of members and visitors at all meetings twenty-seven.

No scheduled verbal communications were made at the stated meetings held during the year.

The special meeting called by the President, April 13, was for the purpose of presenting the Hayden Memorial Geological Award to Dr. William Berryman Scott.

During the year twenty-one members have died and ten have resigned. The losses by death known to the Secretary, were as follows: Henry H. Bonnell, Samuel M. Clement, Jr., Alexander Brown Coxe, Ezra T. Cresson, Dr. Clayton D. Fretz, Bayard Henry, W. Moylan Lansdale, Mrs. Henry Carvill Lewis, George H. McFadden, Jules E. Mastbaum, Randal Morgan, Clement B. Newbold, J. Towers Pennypacker, Arthur W. Pusey, Dr. Henry Skinner, Dr. Allen J. Smith, Antonio Y. Stewart, Daniel B. Wentz, Samuel Price Wetherill, Harold Wingate and George Wood. Of these the deaths of Ezra T. Cresson, for many years the foremost American authority on the Hymenoptera, a founder of the American Entomological Society, whose most valuable collection of hymenopterous insects is deposited with the Academy, and a member of the Academy since 1858; and of Dr. Henry Skinner, Vice-President of the Academy, were particularly notable losses. An appreciation of Dr. Skinner's life and work, as embodied in a minute adopted by the Academy, is printed in the abstract of the proceedings of the meeting of June 8 (see Proceedings of the Academy, 1926, p. 493).

During the year the Academy lost three distinguished Correspondents: Prof. William Bateson, Director of the John Innis Horticultural Institution, Merton, Surrey, England; Dr. Charles Hedley of the Australian Museum, Sydney, New South Wales, and Prof. A. E. Verrill.

Miss Lucy K. Kille, who died during the year, demonstrated her interest in the work of the Academy by bequeathing it the sum of $5,000, while a legacy of $3,000 "for the uses and needs of the Botanical Department" was contained in the will of the late Dr. George N. Best.

Obverse

Reverse

THE HAYDEN MEMORIAL GEOLOGICAL AWARD

The Nineteenth Award, Presented to Dr. William Berryman Scott, April 13, 1926.

The following Correspondents were elected during the year: Henry Balfour, University Museum, Oxford, England; Erwin Baur, Royal Agricultural College, Berlin, Germany; Joseph Grinnell, University of California, Berkeley, California; Michael Guyer, University of Wisconsin, Madison, Wisconsin; Fritz Hass, Senckenbergische Naturforschende Gesellschaft, Frankfurt a/M., Germany; Gotthelf Carl Huber, University of Michigan, Ann Arbor, Michigan; A. F. Basset Hull, Sydney, New South Wales; Chiyomatzu Ishikawa, Imperial University, Tokyo, Japan; Bunjiro Koto, Imperial University, Tokyo, Japan; Samuel Ottman Mast, Johns Hopkins University, Baltimore, Maryland; Herbert Osborn, Ohio State University, Columbus, Ohio; Carlos Emilio Porter, Museo Nacional, Santiago, Chile; Norman Denbigh Riley, British Museum of Natural History, London, England; Erwin Frank Smith, U. S. Dept. of Agriculture, Washington, D. C.; Alexander Wetmore, U. S. National Museum, Washington, D. C.; August Weberbauer, c/o German Legation, Lima, Peru; W. Wenz, Senckenbergische Naturforschende Gesellschaft, Frankfurt a/M., Germany.

The following individuals were elected members:

Sustaining Member: Boies Penrose, 2nd.

Life and Annual Members: William S. Acuff, Perry S. Allen, John S. Arndt, Leonard C. Ashton.

Niles S. Babbitt, Francis L. Bacon, Mrs. Albert L. Baily, R. M. Baily, David G. Baird, Mrs. Ellis Ames Ballard, Miss Emily Barclay, N. Emory Bartlett, Daniel Moore Bates, James H. Beattie, E. N. Benson, Jr., Mrs. E. N. Benson, Jr., Louis J. Bergson, Harold F. Bernhardt, Mrs. Arthur Biddle, Miss E. F. Biddle, Livingston L. Biddle, Miss Harriet E. Blakiston, Dr. P. Brooke Bland, Arthur Bloch, Bernard Bloch, Morris R. Bockius, E. Shirley Borden, Harold Boericke, James Bond, Dr. L. Napoleon Boston, J. Harry Bowers, J. Boyd, Miss Emilie C. Bradbury, Robert S. Bright, Clarence C. Brinton, John T. Brosnan, Andrew V. Brown, R. Nelson Buckley, Louis Burk, E. Lewis Burnham, Miss Mary A. Burnham, Miss M. Theodora Burt, Henry Paul Busch.

Richard M. Cadwalader, Jr., Mrs. Richard M. Cadwalader, Jr., Thomas Cadwalader, George C. Carson, Jr., E. Wallace Chadwick, W. B. Chamberlin, Ellwood B. Chapman, Radcliffe Cheston,

Jr., Oswald Chew, E. W. Clark, James B. Clark, Thomas W. W. Clay, Samuel M. Clement, Jr., Morris L. Clothier, Peyton S. Cochran, G. Dawson Coleman, Henry H. Collins, Henry Hill Collins, 3rd., John W. Converse, George J. Cooke, Mrs. Newton W. Corson, Dr. Martin B. Culver, Elliott Curtiss.

George C. Davies, Mrs. Charles P. Davis, S. Delbert, Jr., James A. Develin, Jr., Frederick M. Devlin, Dr. Edward B. Dewhurst, Charles L. Dexter, Charles D. Dickey, Philemon Dickinson, Dr. John Diven, Joseph M. Dohan, Clarence W. Dolan, H. Yale Dolan, Dr. John C. Donaldson, Dr. John T. Dorrance, Dr. T. McKean Downs, George W. C. Drexel, Alfred I. duPont.

Adolph Eichholz, Charles J. Eisenlohr, William R. Ellison, Fred. J. Ennis, Dr. C. A. Ernst, Robert P. Esty, Mrs. Robert P. Esty, Charles Evans.

Frederic N. Fell, J. Sibley Felton, Carl W. Fenninger, Thomas Fisher, Mrs. Thomas Fisher, Mrs. Alfred W. Fleisher, Henry H. Fleisher, Edward T. Fleming, William T. Fleming, Mrs. Frank B. Foster, William A. Foster, George H. Frazier, Addison B. Freeman, Ernest W. French.

Charles W. Gamble, Alfred Cope Garrett, A. B. Geary, Jacob E. Gegenheimer, Alexander P. Gest, Dr. John H. Gibbon, J. Campbell Gilmore, Herbert N. Goldsmith, James E. Gowen, W. Griffin Gribbel, Clement A. Griscom, 3rd., F. Stanley Groves, Jr.

J. B. Hamilton, B. Frank Harper, C. Addison Harris, Jr., W. Welsh Harrison, Jr., E. Marshall Harvey, Spencer P. Hazard, Daniel L. Hebard, R. E. Hellmer, Mrs. T. Charlton Henry, Mrs. E. Caven Hensel, Edward F. Henson, Shelton A. Hibbs, Walter W. Holmes, Herbert Hope, Edward Hopkinson, Jr., Samuel Horner, Jr., George Howe.

John H. W. Ingersoll, R. Sturgis Ingersoll.

Walter C. Janney, Jr.

George B. Kaiser, Howard Ketcham, C. H. Krumbhaar, Jr., C. Hartman Kuhn.

Edward J. Lavino, Edmund B. Leaming, Archibald O. Leighton, Mrs. John Frederick Lewis, Stacy B. Lloyd, Robert R. Logan, Lewis N. Lukens, Jr.

Henry M. McAdoo, John Franklin McCahan, W. J. McCahan, Jr., John A. McCarthy, George H. McFadden, Miss Mary E. McGill, Edgar S. McKaig, Robert McLean, Frederick McOwen.

Mrs. Campbell Madeira, Miss Jessie W. Masters, Gilbert Mather, Charles P. Maule, Austin G. Maury, Thomas James Meagher, Mrs. Samuel Vaughan Merrick, Miss Elizabeth Canby Morris, Henry S. Morris, Dr. Withrow Morse.

F. Eugene Newbold, Edward Norris.

W. Austin Obdyke.

Mrs. Albert Pancoast, Frank T. Patterson, A. J. Drexel Paul, Dr. Howard Y. Pennell, Arthur E. Pew, Jr., J. Howard Pew, John G. Pew, Beverley R. Potter.

Miss Anna Randolph, Miss Louisa Rawle, Theodore W. Reath, William H. Ridgway, Mrs. Lewis A. Riley, E. F. Rivinus, Charles H. Roberts, G. Brinton Roberts, Henry R. Robins, Dr. John Stewart Rodman, Nicholas G. Roosevelt, Joseph G. Rosengarten, Jr., Henry W. Roth, Thomas M. Royal.

Maurice Bower Saul, Walter Biddle Saul, Mrs. J. Henry Scattergood, Baroness de Schauensee, Harry W. Schlehner, Miss Hannah Lewis Scott, N. M. Seabrease, Miss Helen Semple, Arthur W. Sewall, W. J. Sewell, Jr., Stephen J. Simon, Miss Mary Grubb Smith, William Howard Smith, Hon. William C. Sproul, Mrs. Isaac Tatnall Starr, Mrs. Alfred G. B. Steel, Joseph A. Steinmetz, W. Plunket Stewart, Mrs. Edward T. Stotesbury, C. Frederick C. Stout, Miss Frances L. Sullivan.

Harold R. Tawresey, H. Birchard Taylor, Dr. William H. Teller, John Borland Thayer, 3rd., Walter Thayer, Miss Mabel L. H. Thomas, Dr. W. Hersey Thomas, Mrs. W. Hersey Thomas, Mrs. Justice M. Thompson, Edward Y. Townsend, J. Barton Townsend, J. B. Townsend, Jr., Mrs. George F. Tyler.

Andrew Van Pelt, Mrs. Alexander Van Rensselaer.

Clement R. Wainwright, T. Johnson Ward, Douglas R. Warfield, William M. Weaver, Charles N. Welsh, W. Nelson L. West, William West, A. Heckscher Wetherill, John Price Wetherill, Jr., Charles Wheeler, David E. Williams, 3rd., E. S. Willing, J. Kent Willing, John T. Windrim, James D. Winsor, Jr., Joseph Wood, Jr., Henry N. Woolman, Miss Lila M. Wright.

Alexander C. Yarnall.

C. C. Zantzinger, Dr. M. W. Zimmerman.

Associate Member: Miss Mary E. Deeter, of Reading, Penna.

Junior Members: Miss Ethel Benson, Perry Benson, Peter

Benson, Richard Benson, Robert H. Fleisher, Miss Isabella Marie Hellmer, Joseph R. Hollmer, Lionel T. Herzberg, Francis L. Van Dusen.

In recognition of his gifts to the Academy for general or special purposes, which have totalled in excess of the amount specified in the By-Laws, T. Chalkley Palmer was designated a Sustaining Member.

The following major contributions have been made for the work of the Academy during the year: $1,000 to aid in meeting library expenses and for cases for specimens for the year, and $500 to purchase an important collection of Brazilian birds, from Dr. R. A. F. Penrose, Jr.; $1,000 to aid in meeting the deficit in the 1926 budget, from Effingham B. Morris; $500 each for the same purpose from T. Chalkley Palmer and George L. Harrison; $250 to assist in meeting library and publication expenses during the year, from Morris Miller Green; $200 to aid in the preparation of duck skins, from Charles M. B. Cadwalader; and $100 for the same purpose from Lynford Biddle.

During the year the Academy received by gift from Dr. R. A. F. Penrose, Jr., an oil portrait of John Cadwalader, President of the Academy from 1918 to 1923, and a similar portrait of Dr. Penrose, President from 1923 to 1926. The latter portrait was presented by Dr. Penrose at the request of the Council of the Academy. Both portraits have been placed in the series of Presidents of the Academy in the Reading Room. The furnishings, rugs, pictures and cases placed by Dr. Penrose in the office of the President at the Academy, were similarly presented by him to the institution. The thanks of the Academy and of its Council were by resolution tendered to Dr. Penrose for his appropriate and thoughtful gifts.

Dr. James B. Clemens of New York City and Maurice Clemens of Easton, Penna., presented an oil portrait of their father, Dr. J. Brackenridge Clemens, the pioneer American student of the Microlepidoptera, whose collections are deposited at the Academy. Dr. Clemens' portrait has been hung in the series on the gallery in the Reading Room, and the thanks of the Council have been extended to the donors.

Following the recommendation of the Committee on the Hayden Memorial Geological Award and the approval of the Council,

the nineteenth Hayden Award was conferred upon Dr. William Berryman Scott, of Princeton University, at the special meeting of the Academy held April 13, 1926. The award was made to Dr. Scott, "in recognition of his many researches and publications in the field of vertebrate paleontology, especially that of South America, as described in the Reports of the Princeton University Expeditions to Patagonia and in other memoirs." After the conferring of the Award Dr. Scott addressed the Academy on "The Migration of Mammals in Geological Times." A reproduction of the Hayden Medal is given on the accompanying plate.

Invitations were received for the Academy to be represented at the Fourteenth International Geological Congress at Madrid, Spain, the Jubilee of the Mineralogical Society of London, and the Philadelphia meeting of the American Association for the Advancement of Science.

JAMES A. G. REHN,
Secretary.

Report of the Treasurer

SUMMARY OF THE ACCOUNTS OF GEORGE VAUX, JR., TREASURER OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, FOR THE FISCAL PERIOD ENDED DECEMBER 31, 1926.

GENERAL FUND

RECEIPTS

Balance on hand December 31, 1925	$ 5,548.54	
Net Income from Investments	46,141.98	
Income from Estate of John Turner	161.56	
Income from Estate of Harriet Blanchard	265.26	
Annual Dues	7,833.00	
Interest on Bank Balances	499.99	
Publications sold	523.70	
Miscellaneous Refunds and Receipts	1,190.80	$62,164.83
Transfers from Special Funds:		
For Departmental Expenses		
Mary R. D. Smith Fund	$ 70.00	
Conchological Section Fund "Tryon Trusts"	1,470.00	
Horace N. Potts Fund	70.00	
Aubrey H. Smith Fund	875.00	
J. F. Beecher Memorial Laboratory Fund	1,125.00	
For Museum and other Purposes:		
Mary Jeanes Museum Fund	875.00	
General Endowment Fund	180.00	
Thomas B. Wilson Fund for Librarian's Salary	400.00	
Jessup Male Branch Fund	540.00	
Jessup Female Branch Fund	380.00	
Special Donations—Contributions of R. A. F. Penrose, Jr., toward Cases, Specimens and Library	1,000.00	
Contributions of George L. Harrison toward deficit of 1926 Budget	500.00	
Contributions of T. Chalkley Palmer toward deficit of 1926 Budget	500.00	
Contributions of Effingham B. Morris toward deficit of 1926 Budget	1,000.00	
Contributions of Morgan Hebard toward Salary of Preparator in Entomological Department	300.00	
Contributions of M. M. Green for Library and Binding	250.00	
Transfer from Special Donations—Botanical Department for Preparator	300.00	
Transfer from Special Donations in payment for Specimens	90.00	
Transfer from special Donations "General Purposes"	25.00	
Transfer from J. Leidy Commemoration Meeting Publication Fund	18.89	9,968.89
		$72,133.72

PAYMENTS

Scientific Department and Building Maintenance		
Cases and Departmental Supplies	$ 2,283.52	
Maintenance	5,035.55	$ 7,319.07
On Account of Heffy Collection of Mollusks	1,090.00	1,090.00
Library		
Office Expenses	46.75	
Purchase of Books	1,427.64	
Binding of Books	1,482.00	
Refund on account of overpayment for duplicate books	5.00	2,961.39
Publications		
Printing "Proceedings" 1925	1,860.80	
Printing "Proceedings" 1926	575.94	
Printing "Year Book"	805.10	
Office Expenses	23.10	3,264.94
Treasurer's Department		
Mary S. Warren Annuity	1,800.00	
Audit and Bonding Expenses	130.00	1,930.00
Central Office Expenses		
Express and Postage, Maintenance etc	1,964.80	1,964.80
Insurance Premium on current policies	1,260.98	1,260.98
Salaries	45,057.77	45,057.77
Order of: Mr. S. Raymond Roberts (Checks drawn in error to Academy)	895.50	895.50
Membership Campaign Committee	1,199.25	1,199.25
		66,943.70
Balance December 31, 1926		5,190.02
		$72,133.72

CONCHOLOGICAL SECTION FUND
"TRYON TRUSTS"

RECEIPTS

Balance December 31, 1925	$ 8.57
Net Income from Investments	1,379.63
Balance December 31, 1926—Overdrawn	81.80
	$1,470.00

PAYMENTS

Transferred to General Fund for Curatorial Expenses	$1,470.00

COPE COLLECTION FUND

RECEIPTS

Balance December 31, 1925	$2,934.82
Net Income from Investment	1,019.58
	$3,954.40

F. V. HAYDEN MEMORIAL FUND

RECEIPTS

Balance December 31, 1925	$ 174.99
Net Income from Investments	102.22
Balance December 31, 1926—Overdrawn	7.79
	$ 285.00

PAYMENTS

Disbursed for Hayden Medal	$ 285.00

HORACE N. POTTS FUND

RECEIPTS

Net Income from Investments	$ 291.77
Balance December 31, 1926	287.71
	$ 579.48

PAYMENTS

Balance December 31, 1925—Overdrawn	$ 100.83
Taxes on Somerton Property (½ of cost)	228.65
University of Pennsylvania Survey of Deed (½ of cost)	180.00
Transferred to General Fund for Department Expenses	70.00
	$ 579.48

MARY JEANES MUSEUM FUND

RECEIPTS

Balance December 31, 1925	$ 24.27
Net Income from Investments	870.70
	$ 894.97

PAYMENTS

Transferred to General Fund for Museum Espenses	$ 875.00
Balance December 31, 1926	19.97
	$ 894.97

JESSUP FUND—MALE BRANCH

RECEIPTS

Net Income from Investments	$ 630.04

PAYMENTS

Balance December 31, 1925—Overdrawn	$ 38.64
Transferred to General Fund for Departmental Expenses	540.00
Balance December 31, 1926	51.40
	$ 630.04

JESSUP FUND—FEMALE BRANCH

RECEIPTS

Balance December 31, 1925	$ 82.97
Net Income from Investments	222.86
Balance 1926—December 31—Overdrawn	74.17
	$ 380.00

PAYMENTS

Transferred to General Fund for Departmental Expenses	$ 380.00

J. A. MEIGS LIBRARY FUND

RECEIPTS

Balance December 31, 1925	$ 8.93
Net Income from Investments	556.25
	$ 565.18

PAYMENTS

Books Purchased	$ 554.50
Balance December 31, 1926	10.68
	$ 565.18

J. H. REDFIELD MEMORIAL FUND

RECEIPTS

Balance December 31, 1925	$ 193.13
Net Income from Investments	175.97
	$ 369.10

PAYMENTS

Purchase of Plants	157.68
Balance December 31, 1926	211.42
	$ 369.10

MARY REBECCA DARBY SMITH FUND

RECEIPTS

Balance December 31, 1925	$ .45
Net Income from Investments	71.52
	$ 71.97

PAYMENTS

Transferred to General Fund for Curatorial Expenses	$ 70.00
Balance December 31, 1926	1.97
	$ 71.97

AUBREY H. SMITH FUND

RECEIPTS

Balance December 31, 1925	$ 97.66
Net Income from Investment	735.32
Balance December 31, 1926—Overdrawn	42.02
	$ 875.00

PAYMENTS

Transferred to General Fund for Curatorial Expenses	$ 875.00

FRANCES LEA CHAMBERLAIN FUND

Balance December 31, 1925	$1,226.81
Net Income from Investments	215.77
Balance December 31, 1926	$1,442.58

THOMAS B. WILSON FUND

RECEIPTS

Balance December 31, 1925	$ 5.19
Net Income from Investments	489.82
	$ 495.01

PAYMENTS

Purchase of Books	$ 77.85
Transferred to General Fund for Librarian's salary	400.00
Balance December 31, 1926	17.16
	$ 495.01

WILLIAM S. VAUX FUND

RECEIPTS

Balance December 31, 1925	$ 303.49
Net Income from Investments	503.24
Miscellaneous Receipts	143.91
	$ 950.64

PAYMENTS

Minerals purchased	$ 46.00
Cases and Repairs to Mineral Hall	400.91
Salary advanced	362.49
Balance December 31, 1926	141.24
	$ 950.64

I. V. WILLIAMSON FUND

RECEIPTS

Balance December 31, 1925	$ 63.54
Net Income from Investment	1,909.53
Miscellaneous Refunds	10.95
Balance December 31, 1926—Overdrawn	70.47
	$2,054.49

PAYMENTS

Purchase of Books	$1,990.95
Balance of December 31, 1925 transferred to Girard Trust Co. for investment	63.54
	$2,054.49

J. F. BEECHER MEMORIAL LABORATORY FUND

RECEIPTS

Net Income from Investments	$1,132.70

PAYMENTS

Balance December 31, 1925—Overdrawn	$ 2.96
Transferred to General Fund for Laboratory Expenses	$1,125.00
Balance December 31, 1926	4.74
	$1,132.70

GENERAL ENDOWMENT FUND

RECEIPTS

Balance December 31, 1925	$ 1.72
Net Income from Investment	179.45
	$ 181.17

PAYMENTS

Transferred to General Fund for Departmental Expenses	$ 180.00
Balance December 31, 1926	1.17
	$ 181.17

ELEANOR T. LONG FUND

RECEIPTS

Balance December 31, 1925	$1,000.00
Balance December 31, 1926	$1,000.00

JOSEPH LEIDY MEMORIAL FUND

Balance December 31, 1925	$ 109.56
Net Income from Investments	59.40
Balance December 31, 1926	$ 168.96

ORNITHOLOGICAL SECTION FUND

RECEIPTS

Net Income from Investment	$ 6.76
Balance December 31, 1926	$ 6.76

SPECIAL DONATIONS

GENERAL PURPOSES

RECEIPTS

Balance on hand December 31, 1925	$ 25.00
Balance on hand December 31, 1926	$ 25.00

PAYMENTS

Transferred to General Fund	$ 25.00
	$ 25.00

CONTRIBUTIONS FOR ARCHEOLOGICAL CASES

RECEIPTS

Balance on hand December 31, 1925	$ 59.00
Balance on hand December 31, 1926	$ 59.00

CONTRIBUTIONS FOR PURCHASE OF BIRDS

RECEIPTS

Balance on hand December 31, 1925	$ 90.00
Dr. R. A. F. Penrose, Jr.	500.00
	$ 590.00

PAYMENTS

Disbursed for Collection of Birds	$ 500.00
Balance on hand December 31, 1926	90.00
	$ 590.00

JOSEPH LEIDY COMMEMORATION MEETING PUBLICATION FUND

RECEIPTS

Balance on hand December 31, 1925	$ 18.89
Balance on hand December 31, 1926	$ 18.89

PAYMENTS

Transferred to General Fund	$ 18.89
	$ 18.89

CONTRIBUTIONS FOR VERTEBRATE ZOOLOGY

RECEIPTS

Balance on hand December 31, 1925	$ 400.00
Balance on hand December 31, 1926	$ 400.00

PAYMENTS

Transferred to General Fund	$ 90.00
Balance on hand December 31, 1926	310.00
	$ 400.00

ZOOLOGICAL RECORD FUND

RECEIPTS

Balance of December 31, 1925	$ 100.00
P. P. Calvert	50.00
	$ 150.00

PAYMENTS

Disbursed	$ 150.00
	$ 150.00

CONTRIBUTIONS FOR UNION LIST OF SERIALS

RECEIPTS

Balance on hand December 31, 1925	$ 200.00
	$ 200.00

PAYMENTS

Bisbursed	$ 200.00
	$ 200.00

CONTRIBUTION FOR BUILDING AND MAINTENANCE

RECEIPTS

Balance on hand December 31, 1925	$ 389.45
	$ 389.45

PAYMENTS

Disbursed	$ 315.67
Balance on hand December 31, 1926	73.78
	$ 389.45

CONTRIBUTION FOR CRYSTALLOGRAPHIC TABLES

RECEIPTS

Balance on hand December 31, 1925	$ 25.00
Balance on hand December 31, 1926	$ 25.00

CONTRIBUTIONS FOR ENTOMOLOGICAL PREPARATION

RECEIPTS

Morgan Hebard	$ 360.00
	$ 360.00

PAYMENTS

Transferred to General Fund for Payment of Salary of Preparator	$ 300.00
Balance on hand December 31, 1926	60.00
	$ 360.00

SALE OF DUPLICATE MINERALS

RECEIPTS

Balance on hand December 31, 1925	$ 19.00
	$ 19.00

CONTRIBUTIONS FOR EXPENDITURE BY COUNCIL

RECEIPTS

Balance on hand December 31, 1925 (G. L. Harrison)	$ 322.25
	$ 322.25

PAYMENTS

Disbursed	$ 284.50
Balance on hand December 31, 1926	37.75
	$ 322.25

CONTRIBUTIONS FOR PREPARATION OF DUCK SKINS

RECEIPTS

Lynfield Biddle	$ 100.00
C. M. B. Cadwalader	200.00
	$ 300.00

PAYMENTS

Disbursed	$ 262.00
Balance on hand December 31, 1926	38.00
	$ 300.00

CONTRIBUTIONS FOR LIBRARY AND BINDING EXPENSES

RECEIPTS

M. M. Green	$ 250.00
	$ 250.00

PAYMENTS

Transferred to General Fund	$ 250.00
	$ 250.00

CONTRIBUTIONS ORTHOPTERA FIELD EXPEDITION

RECEIPTS

Childs Frick	$ 100.00
Balance on hand December 31, 1926	$ 100.00

CONTRIBUTIONS FOR BOTANICAL DEPARTMENT

RECEIPTS

R. F. Welsh	$ 60.00
A. N. Leeds	30.00
M. E. Leeds	100.00
Lee Sowden	30.00
T. C. Palmer	50.00
G. M. Beringer	30.00
C. S. Wertsner	25.00
Jos. Crawford	30.00
	$ 355.00

PAYMENTS

Transferred to General Fund for Payments of Salary to Preparator	$ 300.00
Balance on hand December 31, 1926	55.00
	$ 355.00

CONTRIBUTIONS FOR LIBRARY (BOOKS)

RECEIPTS

Dr. Henry Winsor	$ 93.47
	$ 93.47

PAYMENTS

Disbursed for Books	$ 93.46
Balance on hand December 31, 1926	.01
	$ 93.47

CONTRIBUTIONS FOR 1926 BUDGET

RECEIPTS

Dr. R. A. F. Penrose, Jr., (Cases, Specimens and Library)	$1,000.00
George L. Harrison	500.00
T. Chalkley Palmer	500.00
Effingham B. Morris	1,000.00
	$3,000.00

PAYMENTS

Transferred to General Fund	$3,000.00
	$3,000.00

Respectfully submitted,

GEORGE VAUX, JR.,
Treasurer.

E. AND O. E.
PHILADELPHIA,
JANUARY 18, 1927.

Correct—
MARGUERITE P. KOLLINER,
Bursar.

As the result of an audit made by us of the books and accounts of the Academy of Natural Sciences of Philadelphia, relating to "General and Special Funds," we hereby certify that the above statement is in accord therewith and in our opinion correctly reflects the results of the financial activities of the several funds during the period indicated.

(Signed) Edward P. Moxey & Co.,
Certified Public Accountants.

Philadelphia, Pa.
February 12, 1927.

REPORT OF THE TREASURER OF THE MANUAL OF CONCHOLOGY

The Treasurer of the "Manual of Conchology" respectfully reports:

Receipts from all sources, for the year ending November 30th, 1926	1,822.60
Which added to balance on hand December 1, 1925	1,412.71
Makes the total	$3,235.31
The Disbursements were	872.73
Leaving Balance December 1, 1926	$2,362.58

The receipts were as follows:

From Manual Subscriptions, Vol. 26	16.00
" " " Vol. 27	535.17
" Sale of Back Volumes and Parts	1,234.35
" Interest, Daily Bank Balances	37.08
	$1,822.60

The disbursements were:

Check, protested	121.10
Printing	31.85
Printing and Binding	642.42
Stationery	7.34
Artist's Colors, Plates and Paper	18.16
Advertising	4.00
Postage and Expressage	47.86
	$ 872.73

Respectfully submitted,
S. RAYMOND ROBERTS,
Treasurer.

December 1, 1926.
Examined and found correct.
MARGUERITE P. KOLLINER,
Bursar.

Report of the Director of the Museum

The activities of the Museum may be considered under two heads: (I) the exhibits open to the public and the lecture courses presented under the auspices of the Ludwick Institute which constitute the educational feature; and (II) the study collections in the various departments and the work of the scientific staff engaged in their care, development and study, which constitute the research feature.

The maintenance of the scientific staff and its work and the constant care of the vast historic study collections which have formed the basis of natural history research for a century past not only constitute the most important field of the Academy's activity but also absorb all of the Museum appropriation, except such as is required for the upkeep of the building, care of the exhibits, janitor service etc. Therefore until funds are available the elaboration of the present Museum exhibits, the preparation of habitat groups, and other much desired additions must rest in abeyance.

The Public Museum. The exhibition halls have been open to the public throughout the year and the attendance of visitors has constantly increased. Thousands of school children from the city and nearby towns have visited the Museum and studied the collections, usually under the guidance of their teachers, and classes from the art schools have been in regular attendance sketching the exhibits. The registration of visiting school classes has been greater than in any previous year.

Through the aid of the Ludwick Institute the appearance of the mineral hall has been greatly improved. Two large mahogany wall cases were provided for the display of the larger mineral specimens which have been arranged on brackets, while the introduction of electric lights in the cases has added greatly to the beauty and effectiveness of the display. This exhibit was planned and installed by Mr. S. G. Gordon, assistant curator of the department. The hall has also been repainted and provided with new lights. New lights have also been installed in the entrance hall. The cases containing the collection of Pennsylvania forest trees

have been removed from the mineral hall to the entrance hall where they appear to much better advantage.

The local collection of birds has been partially rearranged during the year and the seasonal collection displayed during the spring months as the various species appeared in the vicinity of Philadelphia; both collections have been largely consulted by local bird students.

A Galapagos Marine Iguana received from the Zoological Society of Philadelphia has been mounted and placed on exhibition as well as a number of mammals received from the Society including a Viscacchia, Patagonian Cavy, and young African Elephant. Several additional mounted heads have been hung in the halls including a very fine specimen of Mountain Sheep from Thomas and Charles M. B. Cadwalader; and an Elk, the gift of Mrs. Hampton L. Carson; also a beautifully prepared Sail Fish presented by Mrs. Edward Browning. Besides the special societies meeting in connection with the several organized departments accommodations have been provided for monthly meetings of the Leidy Microscopical Society, and in February the use of the lecture hall was granted to the Garden Clubs of Philadelphia for a meeting and lecture by Monsieur Henri Correvon.

Several additions to the collection of colored casts of local reptiles and amphibians have been prepared during the year, rendering this exhibit nearly complete, as well as casts of several exotic fishes and reptiles.

Lectures. The usual Monday evening and Sunday afternoon courses of free public lectures were again made possible by the Ludwick Institute and one additional lecture was furnished through the coöperation of the Pennsylvania Audubon Society. The attendance has steadily increased during the past few years and this season totalled nearly 6,000. The attendance at each lecture ranged from 150 to 395.

The courses have been arranged and managed, with the approval of the Director, by Mr. Harold T. Green whose services are made possible through the Ludwick Institute. Mr. Green also takes charge of the educational features of the public museum, as assistant to the Director of the Museum.

The lectures of the 1926 courses were as follows:

MONDAY EVENING COURSE

January 11. "Through the Canyons and Forests of Southern Utah." Henry A. Pilsbry, Academy of Natural Sciences of Philadelphia.

January 15. Special Friday Lecture, Pennsylvania Audubon Society "The Cruise of a Naturalist." William L. Finley, State Game Commissioner of Oregon.

January 18. "The Alps from the Air." J. Monroe Thorington, Philadelphia Geographical Society.

January 25. "Wilderness Animals in their Youth." Floyd W. Schmoe, Park Naturalist, Mt. Rainier National Park.

February 1. "The Grand Canyon of the Colorado." Henry W. Fowler, Academy of Natural Sciences of Philadelphia.

February 8. "The Natural History of the New Jersey Pine Barrens." Witmer Stone, Academy of Natural Sciences of Philadelphia.

February 15. "The Mysterious Nomads of Artic Lapland." G. Clyde Fisher, American Museum of Natural History, New York.

March 1. "Santa Marta and Its Sierra." James A. G. Rehn, Academy of Natural Sciences of Philadelphia.

March 8. "The Santa Fé Trail and the Camino Real." Henry A. Pilsbry, Academy of Natural Sciences of Philadelphia.

March 15. "Laysan Island, the Bird Metropolis of the Pacific." C. J. Albrecht, American Museum of Natural History, New York.

March 22. "A Journey through India and Kashmir." Barnum Brown, American Museum of Natural History, New York.

March 29. "Northern Africa." Michael Dorizas, University of Pennsylvania.

April 5. "Birds' Nests and Birds' Eggs." Witmer Stone, Academy of Natural Sciences of Philadelphia.

April 12. "Summer Days on Arizona Trails." James A. G. Rehn, Academy of Natural Sciences of Philadelphia.

April 19. "Albacore Fishing." Henry W. Fowler, Academy of Natural Sciences of Philadelphia.

April 26. "Among Sea Bird Cities of the Atlantic." S. Harmsted Chubb, American Museum of Natural History, New York.

May 3. "Travels in Australia with Cinema and Camera." An exhibition of slides and motion pictures taken by E. Brooke Nichols, Melbourne, Australia.

SUNDAY AFTERNOON COURSE

January 10. "Hawaii, the Land of Showers and Sunshine." Henry W. Fowler, Academy of Natural Sciences of Philadelphia.

January 17. "Aboriginal Life in the Labrador Peninsula." Frank G. Speck, University of Pennsylvania.

January 24. "Caribbean Wanderings." William E. Hughes, Academy of Natural Sciences of Philadelphia.

January 31. "The Bolivian Andes." Samuel G. Gordon, Academy of Natural Sciences of Philadelphia.

February 7. "Off Beaten Tracks in California." James A. G. Rehn, Academy of Natural Sciences of Philadelphia.

February 14. "Australia the Great Barrier Reef." Henry A. Pilsbry, Academy of Natural Sciences of Philadelphia.

February 28. "The Lure of the Moose." J. Fletcher Street, Delaware Valley Ornithological Club.

March 7. "Bird Studies with a Camera." Witmer Stone, Academy of Natural Sciences of Philadelphia.

In addition to these a course of nine lectures on "Local Natural History" was presented by four members of the Academy staff, on Wednesday afternoons, for the benefit of schools and nature clubs. Dr. Stone spoke on the bird and plant life, Dr. Pilsbry on mollusks and crustaceans, Mr. Fowler on reptiles and fishes, and Mr. Rehn on insects. Two contrasting regions were considered, the New Jersey sea coast and the Alleghany Mountains.

Field Work. While no appropriation was available this year for expeditions several collecting trips were made possible through the generosity of members of the Academy or collections secured on other expeditions were obtained by members for the museum.

Through the generosity of Mr. Morgan Hebard, Mr. J. A. G. Rehn was able to accompany him on a continuation of their field study of the Orthoptera of the western United States. Portions of August and September were spent in a reconnaissance of southern Utah and Nevada and northern Arizona. Extensive collections of Orthoptera and many specimens representing other groups of insects as well as valuable distributional data were obtained.

Mr. Charles M. B. Cadwalader spent some weeks on the coast of North Carolina during the spring, collecting water birds for the Academy's study series. He took a taxidermist with him and secured and presented to the museum a valuable series of specimens.

Mr. Morris M. Green, Research Associate in Mammalogy spent the month of July in British Columbia and obtained a number of mammals to supplement the Rhoads British Columbia collection already in the Museum.

Messrs. Rudolph M. deSchauensee and James Bond spent several months on the lower Amazon, in the Pará district collecting zoological material and through the generosity of Dr. R. A. F. Penrose, Jr., their collection of bird and mammal skins has become the property of the Academy. The collectors took special pains to secure species lacking in our series.

Mr. W. Judson Coxey, research associate in entomology, spent some time in Ecuador during the year, collecting Lepidoptera and through his generosity many valuable specimens have been added to the Academy collection.

Mr. Bayard Long, Research Associate in botany again visited Newfoundland in company with Dr. M. L. Fernald of the Gray

Herbarium of Harvard University and part of their collection will be available for the Academy herbarium. Several members of the salaried staff have also engaged in local collecting.

Study Collections and Research. The work of the scientific staff during the year has been noteworthy. The invaluable study collections of the Academy have been maintained in an excellent state of preservation, and progress has been made in the proper housing of such as are not fully provided with modern storage cases. Large and important additions have been made through gift, exchange or exploration, as already explained, or by purchase through the income of special funds established for this purpose in the departments of mineralogy (the William S. Vaux Fund) and botany (the John H. Redfield Fund).

In several fields, notably conchology, entomology, ichthyology, and botany, much original research has been accomplished and important papers published by the staff, while in others, notably ornithology and mammalogy, on account of lack of assistants, the entire time of the curators has been taken up with the care of the collections. Details of work in the several fields in which we have specialists in charge follow.

Mammals. This division of the Department of Vertebrates has benefited through the interest of Mr. Morris M. Green, Research Associate, who has studied and arranged the series of North American mammal skins and has presented many species not formerly contained in the collection. Many of these were obtained on his trip to British Columbia in July. The first half of the month was spent in the mountains, near the headwaters of the Fraser River, in east central British Columbia, where specimens of boreal races of voles, shrews, white-footed mice, chipmunks, pikas and hoary marmots were obtained. At Ashcroft, in the arid interior belt, en route to the Pacific Coast, he obtained a yellow-bellied marmot, a new species to the Academy's mammal collection. Ten days were spent on Vedder Creek, eighteen miles south of Chilliwack, in southwestern British Columbia, in the humid coast belt, where voles, shrews, moles and mice, characteristic of this belt, were obtained.

A small but important collection of Brazilian mammals was acquired with the deSchauensee and Bond collection of birds, and

the Zoological Society of Philadelphia has presented a number of specimens which have been prepared as skins or skeletons.

While we have no one working on the fossil vertebrates, a portion of the Port Kennedy collection has been loaned to Mr. Childs Frick of the American Museum of Natural History, who has had many of the fragmentary specimens restored by the expert preparators of that institution and has had excellent casts made of them, a series of which, along with the originals, has been returned to the Academy.

Specimens of mammals were loaned to A. B. Howell and of vertebrate fossils to C. W. Gilmore.

Birds. The illness of Mr. Huber, Assistant Curator of birds and mammals during the early part of the year, and the executive duties of the Curator, as Director of the Museum, have greatly hampered the work in this field.

It has however been possible to rearrange the entire series of local land birds according to sequence of plumage and to label them, in part, on this basis, which renders the collection much more available for study. A local series of water birds has also been segregated. Another important installment of Chinese birds has been secured from our native collector in Kiang Ku and collecting in Siam has continued under the direction of Dr. Hugh M. Smith, of Bangkok. This work has been made possible largely through the generosity of Mr. George L. Harrison.

The deSchauensee-Bond collection from the Pará district of Brazil contained some 500 specimens and filled many gaps in our series.

A number of rare species representing genera not previously in the collection were also secured during the year and many skins were prepared from specimens received from the Zoological Society of Philadelphia.

The notable collection of duck skins begun two years ago by Mr. Charles M. B. Cadwalader has been largely increased during the year through his liberality. He has made special efforts to secure adequate series of certain species not hitherto well represented and has provided a taxidermist to prepare the material. Largely through his efforts, too, other sportsmen have contributed valuable specimens from their bags. Mr. Cadwalader's trip along

the coast of North Carolina in the spring added a fine series of herons, terns, etc.

Dr. Stone, Curator of vertebrates, has nearly completed a report on the Pará collection and has prepared and published several papers for 'The Auk' as well as two read before the meeting of the American Ornithologists' Union, in Ottawa in October, which he and Mr. Huber attended. The Delaware Valley Ornithological Club has held its meetings regularly in the Academy and has done much to further the activites of the department.

M. Jean Delacour, the noted French ornithologist, Dr. Harry C. Oberholser, and Dr. Alexander Wetmore, have visited the department during the year and consulted the collections, while specimens were loaned to C. E. Hellmayr, Admiral H. Lynes, P. A. Taverner and Henry Tucker.

Reptiles and Amphibians. All specimens received during the year, mostly local, have been installed in the collection, while most of the Amphibia have been gone over and the alcohol replenished. The collection has been in charge of Mr. Henry W. Fowler, Associate Curator of fishes and reptiles. Mr. Percy Viosca and Prof. A. H. Wright have studied material at the Museum.

Fishes. Mr. Fowler who has had charge of the division of fishes has devoted almost the entire year to the study of collections submitted by other institutions for determination and report, from which the Academy will receive, in return, valuable duplicate series aggregating thousands of specimens, mainly of species unrepresented in our collection. The reports prepared by him constitute important contributions to ichthyology.

His principal work has been a study of the labroid and related fishes of the Philippine Islands in the U. S. National Museum. Several trips were made to Washington where the larger species were studied while the others were prepared for shipment to Philadelphia. His report has been completed and submitted for publication.

Another report was on a collection submitted by the Bombay Natural History Society and still another on the Polynesian collection made by the "Whippoorwill," Expedition which will be published by the Bishop Museum of Honolulu. Mr. Fowler has also completed his "Fishes of Oceania" for the same institution and it is now in press.

The general collection of fishes has had his constant attention and the alcohol has been replenished on all the specimens.

He has been assisted in the care of the collection by Mr. J. Gordon Carlson, who generously offered his services and who, during the summer, made a collection of some 500 specimens of the fishes of northwestern Pennsylvania which he has presented to the Academy.

Mollusks and Invertebrates Other Than Insects. Dr. Henry A. Pilsbry, Curator, and Mr. E. G. Vanatta, Assistant Curator, have cared for the collections in this department, which have been increased by accessions from 111 persons and institutions, in all about 10,000 specimens or lots, mainly mollusks, have been received. Among the gifts may be mentioned collections of Central and South American mollusks from A. A. Olsson and Joshua L. Baily, Jr., 152 lots of land and fresh water shells from Newfoundland, collected by Bayard Long, and a collection from Lake Tanganyika made by the late Charles Hedley.

Information relating to invertebrates has been supplied to 153 persons. Collections of mollusks from our duplicates have been furnished to three museums and schools.

The Curator has published the final installment of a monograph on the Pupillidae, a monograph of land mollusks of Panama and the Canal Zone; a review of Korean land mollusks; and several papers on mollusks of California, Brazil, Peru and other countries. Dr. H. Burrington Baker, Research Associate, has published anatomical papers on Veronicellidae, Helicinidae, and *Proserpina*, based upon our material. Mr. Vanatta has been occupied chiefly with the labelling of new collections and in identifying Newfoundland mollusks.

During the first half of the year Mr. Ralph B. Stewart, from the University of California, worked upon our Californian type fossils of the W. M. Gabb collection, his results being published in the 'Proceedings' of the Academy.

Dr. J. Percy Moore has carried on research work at the Academy on the Annelida and has looked after the collection; and Miss Caroline Ziegler has continued as aid.

Specimens of invertebrate fossils were loaned during the year to W. P. Woodring, Julia Gardner, and R. B. Stewart, while the Leidy collection of Nematoda was loaned to A. C. Walton.

Insects. The death in May last of Dr. Henry Skinner, Curator of the Entomological Department since 1890, has been keenly felt. Mr. Morgan Hebard was appointed Curator of insects late in the year. Misses Dorothy Tubb, Louise Mackey, Louise Knobel, and Natalie Rogers, have served as aids, two having been employed throughout the year and three during the last few months.

The placing of the Horn collection in glass top boxes has progressed and should be completed during the coming year.

Among the important accessions are a collection of Tipulidae (Diptera) numbering 11,450 specimens, including ninety types, presented by Dr. William G. Dietz; a collection of about 2,000 specimens of various orders, presented by Mr. Frank M. Haimbach, and numerous specimens of Lepidoptera presented by Mr. R. C. Williams, Jr., and Mr. W. Judson Coxey.

During the year 350 additional boxes for the collections have been secured, and 75 metal storage cases largely through Mr. Morgan Hebard, and two rooms have been provided with metal racks in order to double deck this equipment.

Mr. E. T. Cresson, Jr., Assistant Curator, has handled most of the departmental correspondence and clerical work. He has continued his studies in the dipterous families Ephydridae and Micropezidae, the results of which were the publications of the following papers:

"Descriptions of new species of the dipterous family Ephydridae from Hawaii." (Proc. Hawaiian Ent. Soc. vi, p. 275–278.)

"Descriptions of new genera and species of Diptera: Ephydridae and Micropezidae." (Trans. Amer. Ent. Soc., li, p. 249–274.)

Mr. R. C. Williams, Jr., Research Associate, has continued his studies in the American Hesperiidae (Lepidoptera) and is now assembling and arranging the neotropical Pamphiliinae. He has published "Studies in the Neotropical Hesperiidae." (Trans. Amer. Ent. Soc., lii, p. 61–88.)

Mr. W. J. Coxey, recently appointed as Research Associate, has returned from a three months collecting trip in Ecuador and is now studying the material secured, principally Lepidoptera. He is specializing in the Saturniidae and associated families.

Mr. J. A. G. Rehn, Associate Curator, has completed a study

of the South African Mantidae and has continued his studies of the genera *Stirapleura*, *Psoloessa*, *Derotmema* and related South American genera, and taken up the study of the African Blattidae from the Paris Museum collection and other African series of the same family in the Academy's and other collections now in his hands. He has read the entire proof of an extensive study of the Blattidae of the West Indies, now in course of publication, and on which he spent some years of his available research time. He has published "Zoological Results of the Swedish Expeditions to Central Africa 1921. Insecta Blattidae," (Arkiv for Zool. K. Svenska Vet. Akad. 18A, No. 18. pp. 1 to 24.)

Mr. Morgan Hebard has completed a large exchange of Orthoptera with the Geneva Museum, receiving many historic specimens of unusual value. Desirable exchanges have also been made with the Leningrad Museum. He has finished the arrangement of the exotic Cyrtacanthacrinae (Orthoptera). His publications are:

"A Key to the North American Genera of the Acridinae which occur North of Mexico—Orthoptera (Acrididae)," (Trans. Amer. Ent. Soc., lii, pp. 47–59.)

"Records of Hawaiian Dermaptera and Orthoptera of the Family Gryllidae," (Proc. Hawaiian Ent. Soc., vi. pp. 299–303.)

"The Blattidae of French Guiana." (Proc. Acad. Nat. Sci. Phila., pp. 135–244.)

"A Revision of the North American Genus Belocephalus." (Trans. Amer. Ent. Soc., lii. pp. 147–186.)

"Tanager Expedition. Dermaptera and Orthoptera." (Bernice P. Bishop Mus., Bull. 31, pp. 82–88).

The American Entomological Society has held its meetings regularly at the Academy and in December some 350 of the visiting entomologists, attending the meeting of the American Association for the Advancement of Science, were present at a smoker given by the members of the American Entomological Society in the rooms of the department.

Specimens have been loaned to the following students: P. P. Calvert, W. S. Fisher, J. C. Lutz, T. B. Mitchell, J. M. Aldrich, L. G. Gentner, H. S. Peters, J. B. Wallis, D. H. Blake, W. F. Lawler, Jr., and M. Walker.

Plants. Dr. Francis W. Pennell, Curator of the department of botany, has superintended work in the general herbarium, while

Mr. Bayard Long has again generously volunteered his services as Curator of the local herbarium. During the year upward of 8,000 sheets of plants have been mounted for the former and 4,000 for the latter. This work, however, only takes care of the accessions while but little progress has been made in mounting the accumulation of 100,000 specimens in storage. The most notable accession of the year has been the gift of Mr. Edwin B. Bartram of his entire collection of flowering plants and ferns numbering some 12,000 specimens, representing many years' collecting in various parts of the United States and Canada.

Another valuable accession was a collection of 200 specimens. from Greenland, Iceland and Jan Mayen, received in exchange from the University of Copenhagen: Important collections were also received from Quebec and from Japan.

The Curator, Dr. Pennell, besides superintending the work of his aids has sorted out and labelled sets of the plants obtained on his 1924–5 Peru-Chile expedition, for the three other contributing institutions. He has also prepared revisions of the Scrophulariaceae of the southeastern and western Gulf States to appear in Dr. John K. Small's forthcoming manuals and also reports on the plants of this family for the Middle Atlantic and North Central States and for Ontario. Specimens from many herbaria have been loaned for this work and when the reports appear Dr. Pennell will have studied the material contained in the herbaria of twenty-five institutions.

Dr. Pennell has published two papers: "The Genus Afzelia: a Taxonomic Study in Evolution" (Proc. Acad. Nat. Sci. 1926, pp. 335–373) and "The Elder Barton—His Plant Collection and the Mystery of his Flora" (Bartonia no. 9 pp. 17–34). He has also acted as editor for the taxonomy of Spermatophyta for "Biological Abstracts" and attended the Fourth International Botanical Congress at Ithaca, serving as Assistant Secretary of the taxonomic section.

In December he served as Secretary of the systematic section of the Botanical Society of America on the occasion of the fifth Philadelphia meeting of the American Association for Advancement of Science. One of the sessions was held at the Academy and many botanists at this time visited the herbarium. On December 17 a

meeting of the Plant Conference Board of the Middle Atlantic and North Eastern States was held at the Academy.

Visitors during the year also included, Prof. Hugo Glück of Heidelberg, and Prof. Ernst Lehmann of Tübingen, Germany, Dr. P. A. Rydberg of New York, Prof. E. B. Payson of the University of Wyoming and Prof. Harold St. John of the State College of Washington; Mrs. Agnes Chase and Dr. E. T. Wherry of the U. S. Department of Agriculture, Prof. B. C. Tharp of the University of Texas, and C. C. Deam of Indiana. To many of these we are indebted for the identification of specimens.

The Philadelphia Botanical Club has continued to hold its meetings in the herbarium and many of the members have made valued contributions to the local collection. To Messrs. Walter M. Benner, Robert R. Dreisbach, Henry A. Lang, and Dr. H. B. Meredith, we are also indebted for aid in arranging and identifying herbarium material, and to other members of the Club for generous contributions which have made possible the employment of an additional half time aid and securing the full time of another during part of the year.

The plant mounters, Miss Ada Allen and Geo. W. Bassett, and the aids employed during the year, Jos. W. Adams, Robert Little and Walter Southwick, have rendered most efficient service.

Specimens have been loaned during the year to J. M. Greenman, Agnes Chase, M. L. Fernald, J. W. Rose, Field Museum of Natural History, University of California, H. C. Creutzberg, J. K. Small, Missouri Botanic Garden, U. S. National Museum, E. P. Killip A. S. Hitchcock, N. L. Britton and E. L. Braun.

Minerals. Besides the installation of the larger mineral specimens in the exhibition series as already described, the Assistant Curator, Mr. Samuel G. Gordon, has engaged in crystallographic and optical investigations in the laboratory. Collecting trips were made to the French Creek mines in company with Mr. George Vaux, Jr., and also to the South Mountain district of Adams Co., Pa., and the serpentine barrens of Chester and Lancaster Co., Pa. The Adams County trip yielded specimens of metabasalts and metarhyolites and also native copper and piedmontite.

Dr. Edgar T. Wherry presented a fine specimen of allanite and zircon from McKnights Gap, Berks Co., Pa. From Mr.

Henry Goldsmith were received a petrographic microscope, a Dancer microscope, and accessories, and other miscellaneous apparatus, also a collection of rocks and minerals in three cabinets, all the property of the late Dr. Edward Goldsmith. Mr. Gordon was given five months leave of absence beginning September 11, to pursue studies in Germany and also attend the Jubilee Meeting of the Mineralogical Society (London) as delegate of the Academy and the Mineralogical Society of America.

The Philadelphia Mineralogical Society held its meeting in the Academy during the year and added to the activity of the department.

Archaeology. The departments of minerals and archaeology, where no curators have been appointed, are in the immediate charge of the Director of the Museum. Miss H. Newell Wardle, Assistant Curator, has continued to care for the collections of the latter department during the year.

As a result of Mr. Clarence B. Moore's continued interest in the department, arrangements have been made with the Museum of Anthropology, Ann Arbor, Michigan, for the receipt of a collection of archaeological material from Michigan which will fill a gap in the Academy's collection.

WITMER STONE,
Director of the Museum.

REPORT OF THE CURATOR OF THE WILLIAM S. VAUX COLLECTION

The past year witnessed a radical, although but temporary, change in the policy of the Wm. S. Vaux Collection. Intensive efforts to perfect the collection which had characterized previous years, were abandoned for the time being and attention concentrated on the better display of its specimens. In connection with the new exhibition cases furnished by the Ludwick Institute and the electric lights installed by the Academy, the Wm. S. Vaux Fund provided for painting the mineral hall and furnished the brackets and other equipment necessary for the mounting of the specimens, over one hundred and sixty of the largest and finest specimens being now displayed.

A few specimens have been secured during the year, among which the most noteworthy were, a large calcite crystal from

French Creek mines, a suite of celestite crystals from Clay Center, Ohio, and the following species not heretofore represented in the collection: quenselite, curtisite, natrophilite, siderazote, flajolotite, neotantalite, apjohnite and laurite.

The rearrangement of the collection and installation of specimens in the new cases was preformed by Mr. Samuel G. Gordon during the summer months.

F. J. KEELEY,
Curator William S. Vaux Collection.

ADDITIONS TO THE MUSEUM

1926

MAMMALS

THOMAS and CHARLES M. B. CADWALADER. Mounted head of Rocky Mountain Sheep.

MRS. HAMPTON L. CARSON. Mounted Elk Head.

MORRIS M. GREEN. Fifty-five skins and skulls of North American Mammals.

CHARLES HUSTED. Young Chimpanzee.

DR. R. A. F. PENROSE, JR. (by purchase). Six mammal skins and skulls, Pará district Brazil.

PURCHASED 1925. Aard Vark.

RODOLPHE MEYER DE SCHAUENSEE. Skin of rabbit. Pará district Brazil.

ZOOLOGICAL SOCIETY OF PHILADELPHIA. Tasmanian Devil (*Sarcophilus ursinus*); Great Anteater (*Myrmicophaga jubata*); two Tamanduas (*Tamandua tetradactyla*); Two-toed Sloth (*Choloepus hoffmanni*); two Argentine Cavies (*Dolichotis patachonica*); two Viscaccias (*Viscaccia chilensis*); Crested Hamster (*Lophiomys imhausi*); European Hedge Hog (*Erinaceus europaeus*); African Hedge Hog (*E. diadematus*); Mrs. Gray's Water Buck (*Onotragus megaceros*); Dorcas Gazelle (*Gazella dorcas*); Young Tapir (*Tapirus bairdi*); European Polecat (*Mustela putorius*); Geoffroy's Marmoset (*Midas geoffroyi*); Drill (*Cynocephalus maimon*); Wooly Monkey (*Lagothrix* sp.); Orang Utan (*Simia satyrus*); Cebus Monkey (*Cebus* sp.); Red Howler Monkey (*Alouatta seniculus*).

BIRDS

R. DALE BENSON, JR. Hooded Merganser (*Lophodytes cucullatus*); Red-tailed Hawk (*Buteo borealis*); White-winged Scoter, (*Oidemia deglandi*).

RICHARD E. BISHOP. Surf Scoter (*Oidemia perspicillata*); Horned Grebe (*Colymbus auritus*); Brant (*Branta bernicla*).

MRS. EDWARD W. BROWNING. Whistling Swan (*Olor columbianus*), Chesapeak Bay.

LOGAN M. BULLITT. Canada Goose (*Branta canadensis*).

CHARLES M. B. CADWALADER. Two hundred and thirty North American birds, mainly ducks.

C. M. CLARK. Sixteen North American ducks.

The MISSES DE HAVEN. Cabinet of mounted birds.

JOHN DRAYTON. Hybrid Duck.

W. M. FIELD. Virginia Rail (*Rallus virginianus*).

ARTHUR H. FISHER. Five bird skins, Brazil.

JAMES R. GILLEN. Western Crow (*Corvus brachyrhyrchos hesperis*); Townsend's Solitaire (*Myiadestes townsendi*); Richardson's Grouse (*Dendragapus richardsonii*), Alberta, Canada

V. B. GRIGGS. Red-shouldered Hawk (*Buteo lineatus*); Barred Owl (*Syrnium varium*).

JOSEPH HARRISON. Lady Amhearst Pheasant (*Chrysolophus amhearstiae*).

CHARLES S. HEBARD. Twenty Mallard Ducks (*Anas platyrhynchos*).

MORGAN HEBARD. Black Duck (*Anas rubripes*).

W. O. HODGES. Two Red-tailed Hawks (*Buteo borealis*).

W. G. HOPKINS. White-winged Scoter (*Oidemia deglandi*) and Surf Scoter, (*O. perspicillata*), New Jersey.

WHARTON HUBER. Bald-pate Duck (*Mareca americana*).

MRS. WALTER M. JAMES. Screech Owl (*Otus asio*).

JOE KIM LEE. Chinese Shrike.

R. R. LOVETT. Mourning Dove (*Zenaidura m. carolinensis*).

F. GUY MEYERS. American Bittern (*Botaurus lentiginosus*).

CHARLES H. NEWCOMB. Old-Squaw Duck (*Harelda hyemalis*).

MRS. PELTZ. Case of mounted birds.

GEORGE L. HARRISON. Collection of birds from China (purchased).

DR. R. A. F. PENROSE, JR. Collection of birds from Brazil (purchased).

JAMES A. G. REHN. Sternum and Scapulae of Bald Eagle (*Haliaetus leucocephalus*).

WINTHROP SALTUS. European Widgeon (*Mareca penelope*).

WM. HOWARD SMITH. Two Bobwhites (*Colinus virginianus*); Snowy Owl (*Nyctea nyctea*); American Merganser (*Mergus americanus*); Old-Squaw Duck (*Harelda hyemalis*).

WITMER STONE. Bronzed Grackle (*Quiscalus quiscula aeneus*), New Jersey; Black Duck (*Anas rubripes*); Audubon's Shearwater (*Puffinus l'herminieri*).

DR. SPENCER TROTTER. Collection of three hundred and forty-eight North American bird skins.

DR. HENRY TUCKER. Greater Snow Goose (*Chen hyperboreus nivalis*).

LOUIS WEBER. Two Florida Ducks (*Anas fulvigula*); two Purple Gallinules (*Ionornis martinica*); two Florida Gallinules (*Gallinula galeata*); two mounted specimens of Limpkin (*Aramus giganteus*) Florida.

W. H. WEHERLE. Young Red-tailed Hawk (*Buteo borealis*).

W. B. WHITE. Two Snow Geese (*Chen hyperboreus nivalis*).

JAMES D. WINSOR, JR. Ten Snow Geese (*Chen hyperboreus nivalis*).

ZOOLOGICAL SOCIETY OF PHILADELPHIA. Manchurian Eared Pheasant (*Crossoptelon mantchuricum*); Kagu (*Rhinochetes jubatus*); Francolin sp.? Sulphur-breasted Toucan (*Ramphastos piscivorus*); White-collared Hawk (*Leucopternus melanops*); Citrine-crested Cockatoo (*Cacatua citrinocristata*); Yellow-fronted Parrot (*Poicephalus flavifrons*); Black-headed Conure (*Aratinga nanday*); Yellow-headed Conure (*Aratinga solstitialis*); Superb Starling (*Spreo superbus*); Javan Finch (*Munia oryzoborus*); Ultramarine Finch (*Hypochaera ultramarina*); Australian Weaver Finch (*Poephila personata*); Desmarest's Tanager (*Tangara desmaresti*); Rice Grackle (*Cassidix oryzivorus* subsp.); Glossy Starling (*Lamprocolius bispecularis*); Black-crested Yellow Bulbul (*Otocompsa flaviventris*); Vulturine Guinea Fowl (*Acryllium vulturinum*); Double-crested Cormorant (*Phalacrocorax dilophus*); Barn Owl (*Tyto pratincola*); Egret (*Casmerodius egretta*); Blue and Yellow Macaw (*Ara ararauna*); White Pelican (*Pelecanus erythrorhynchos*); Bobolink (*Dolichonyx oryzivorus*).

REPTILES

F. A. NJOISE. *Lampropeltis doliatus*. Pennsylvania.

R. W. WEHRLE. Collection of several hundred Salamanders, and six Snakes, Pennsylvania.

ZOOLOGICAL SOCIETY OF PHILADELPHIA. Various Lizards and Snakes.

FISHES

R. DALE BENSON. Collection of marine fishes, New Jersey.

MRS. EDWARD W. BROWNING. Mounted Sail-fish, Florida.

CHARLES M. B. CADWALADER. Collection of Marine fishes, North Carolina.

GORDON CARLSON. Seven hundred freshwater fishes, Pennsylvania.

FAIRMOUNT PARK AQUARIUM. Sargasso Fish, New Jersey.

PROFESSOR CHARLES LAWALL. *Chaetodon ocellatus*, New Jersey.

LOUIS MOWBRAY. Collection of marine fishes, Florida.

DR. HENRY WINSOR. Jar of freshwater fishes.

INSECTS

ACADEMY UTAH EXPEDITION (1926). Eighteen hundred Orthoptera, Utah, Arizona and Nevada.

JACOB AEBLY. Three Orthoptera, Pennsylvania and New Jersey.

DR. H. W. ALLEN. Five *Tiphia popiliavora*, five *T. vernalis*.

PROFESSOR ANASTASIO ALFARO. Eighty-eight Orthoptera, Costa Rica.

DR. JOSEPH BEQUAERT. One hundred and twenty-six Orthoptera, Brazil.

E. R. BUCKELL. Two specimens of *Grylloblatta campodeiformis*, Canada.

JOSE CABRERA. Two specimens of *Neoconocephalus*, Cuba.

P. P. CALVERT. One Hymenopteron and one Dipteron, Costa Rica.

T. D. A. COCKERELL. Three *Papilio mackii*, Siberia.

W. J. COXEY. Twenty-five hundred specimens of Lepidoptera, Ecuador; *Morpho lympharis*.

COL. M. L. CRIMMINS. Two scorpions, Texas.

DR. WILLIAM G. DIETZ. 11,275 specimens of Diptera including 90 types, 175 specimens of Lepidoptera.

L. G. GENTNER. Seven specimens of Chrysomelidae, Michigan.

J. D. GUNDER. *Angiades scudderi*, California; *Hesperoleon intermedius*, California.

FRANK HAIMBACH. Collection of 2,065 Diptera, 1,279 Hymenoptera, 398 Neuroptera, 272 Odonata, 241 Orthoptera.

MORGAN HEBARD. Twenty-six *Tettigidea prora*, Tennessee; five specimens of Hemiptera, Sumatra.

CHARLES N. HICKS. Twenty-two specimens of Orthoptera, Colorado.

PEDRO JORGENSEN. 288 butterflies and moths, Paraguay.

FRANK JOHNSON. 35 exotic Lepidoptera.

F. M. JONES. Eighteen specimens of Diptera, Eastern United States; two *Amblyscirtes carolina reversa* (Type and Allotype) Virginia; *Oiketicus dendrokonos*, Texas; two cocoon cases, Texas.

C. H. LANKESTER. Eight Orthoptera, Costa Rica.

CHARLES LIEBECK. Ninety-four Orthoptera, Pennsylvania.

PROFESSOR V. A. LITTLE. Five Orthoptera, Texas.

DR. H. B. MEREDITH. Four Orthoptera; two Coleoptera, Massachusetts.

W. P. MORGAN. Eight *Forficula auricularia*, Switzerland.

HAL NEWCOMB. Forty-five Hesperiidae, Colombia; forty-two Hesperiidae, Ecuador.

N. E. PEARSON. Four *Amblycorypha oblongifolia*, Indiana.

J. A. G. REHN. *Labia minor*, Pennsylvania.

CHARLES ROMANCHAK. *Strategus antaeus*, Florida.

RODOLPHE DE SCHAUENSEE and JAMES BOND. Two hundred and forty-one Orthoptera, four Coleoptera, four Hemiptera and one Odonata, Brazil.

PROFESSOR VASCO M. TANNER. Two *Spongovostox apicedentatus*, Utah; *Stagmomantis californicus*, Utah; *Arenivaga* sp., Nevada.

WILLIAM H. TOMS, JR. Specimen of *Diapheromera*, New Jersey.

CHARLES R. TOOTHACKER. Fifty moths, Brazil.

TRANSVAAL MUSEUM. Thirty-eight Mantidae, Africa (in return for identifications).

PROFESSOR J. FIDEL TRISTAN. One hundred and forty-nine Orthoptera and Dermaptera, Costa Rica.

H. W. TRUDELL. Specimens of Buprestid.

HARRY L. VIERICK. Thirty-five hundred Hymenoptera.

L. H. WELD. One hundred and thirteen specimens Cynipidae (insects and galls.) Paratypes.

R. C. WILLIAMS, JR. Thirteen hundred and eighty-six Lepidoptera.

MOLLUSCA

ACADEMY UTAH EXPEDITION (1926). Ten trays of shells.

J. W. ADAMS. Forty-seven lots of land and freshwater shells.

J. L. BAILY, JR. One hundred and twenty-seven lots of shells from North America.

F. C. BAKER. Eight lots of freshwater shells.

DR. FRED BAKER. Three species of American shells.

DR. H. B. BAKER. Five species of Tropical American land shells.

DR. P. BARTSCH. Five trays of *Obba* from the Philippine Islands.

DR. S. S. BERRY. Thirty-two lots of American non-marine mollusca.

DR. S. C. BISHOP. Four trays of shells from New York.

H. J. BOCKELMAN. Two species of *Partula*.

W. E. BROADWAY. *Leptinaria lamellata* P. & M. from Trinidad Island.

R. H. BULLEY. *Cymatium martinianum* Orb. from Pompano, Florida.

H. C. BURNUP. (Exchange.) Twelve lots of *Gulella* from South Africa.

C. M. B. CADWALADER and DR. H. H. DUBOIS. Thirty-nine lots of marine shells from South Carolina.

CALIFORNIA ACADEMY OF SCIENCES. Fifty-eight trays of land shells from Lower California and Guadalupe Island.

M. H. CARRIKER, JR. Three land shells from Colombia.

E. P. CHACE. *Helminthoglypta cayucosensis* Pils. from California.

PROFESSOR P. W. CLAASSEN. Seventeen lots of fresh-water shells from New York.

G. H. CLAPP. Two land shells from southeastern U. S.

J. B. CLARK. Sixty-two lots of shells from Pennsylvania and New Jersey.

W. J. CLENCH. *Sonorella ambigua* P. & F. from the Roskruge Mountains, Arizona.

PROFESSOR T. D. A. COCKERELL. Eight lots of foreign land shells.

W. P. COCKERELL. *Thysanophora minima* Pils. from Quiriqua, Guatemala.

Prof. C. R. CROSBY. Five lots of land shells from Florida and Texas.

DR. W. H. DALL. Seven species of shells from America and Japan.

C. R. DONHAM. *Goniobasis p. silicula* Gld. from Corvallis, Oregon.

M. DOUGHERTY. *Cassis rufa* L.

J. FARQUHAR. *Lauria forquhari* M. & P. from Elandsberg Mt.

DR. F. FELIPPONE. Twenty-eight lots of South American fresh-water shells.

JAMES H. FERRISS. Eleven land shells from Idaho.

A. H. FISHER. Seven species of Brazilian shells.

H. W. FOWLER. *Physa heterostropha* Say from Dark Hollow, Bucks Co., Pennsylvania.

FREE LIBRARY OF PHILADELPHIA. A collection of shells.

DR. JULIA GARDNER. Fifty-three species of land shells from Texas.

F. C. GATES. *Valvata tricarinata* Say from near Ingleside, Michigan.

MRS. A. B. GILLILAND. Four species of shells from Oregon and California.

H. GOLDSMITH. *Crystallopsis aphrodite* Pfr.

M. M. GREEN. *Planorbis horni* Tryon from Moose Lake, British Columbia.

HAMBURG MUSEUM (Exchange). *Thysanophora impura* Pfr. from Vera Cruz, Mexico.

E. E. HAND. Twenty-five Cuban land shells.

A. W. HANHAM. Fifteen lots of land shells from Vancouver Island.

G. L. HARRISON. *Lymnaea catascopium* Say from Restigouche, Canada.

C. S. HEBARD. Three fresh-water shells from the Santee River, South Carolina

C. HEDLEY. A collection of shells from Lake Tanganyika.

J. HENDERSON. Two species of land shells from Missouri and Idaho.

T. CHARLTON HENRY. A collection of shells from Florida.

P. HESSE (purchased). A collection of land and fresh-water shells.

A. A. HINKLEY. Four Mexican land shells.

Y. HIRASE. Twenty-two trays of Japanese shells.

C. HODGE, JR. *Liguus perversus* Swains. from Kartabo, British Guiana.

W. HUBER. Three Canadian shells.

F. W. KELSEY. *Oreohelix c. kelseyi* Hemp. from Raymond, Wyoming.

DR. L. KUSCER (exchange). Forty-nine lots of European land shells.

D. B. LANGFORD. Sixteen lots of Japanese land shells.

HON. F. R. LATCHFORD. Six trays of Canadian fresh-water shells.

N. W. LERMOND. Two marine shells from Florida.

H. CARVILL LEWIS ESTATE. A collection of marine shells.

BAYARD LONG. One hundred and forty-two lots of shells from Newfoundland.

H. N. LOWE. Nineteen trays of North American land shells.

DR. H. LUEDERWELDT. Five species of Brazilian shells.

J. G. MALONE. Twenty lots of shells from Oregon and Washington.

DR. H. B. MEREDITH. *Planorbis dilatatus* Gld. from Fishing Creek Forks, Columbia County, Pennsylvania.

PHILIP NELL ESTATE. One hundred and thirty-seven lots of shells.

C. NEWELL. Eight species of Unionidae from Wisconsin.

NORTH DAKOTA STATE SCHOOL OF SCIENCE. *Lymnaea* from N. Dakota.

I. S. OLDROYD. Thirty-six lots of shells from California and Idaho.

A. A. OLSSON. Seventy-one lots of Central American shells.

LT. COL. A. J. PEILE. Six lots of *Acteocina* from Bermuda.

DR. F. W. PENNELL. *Radiodiscus* from Peru.

L. M. PERRY. Three species of marine shells from Florida.

DR. H. A. PILSBRY. Two hundred and fifty lots of Australian shells.

R. M. DE SCHAUENSEE. *Physa* from Pará, Brazil.

M. SCHICK. *Helminthoglypta walkeriana* Hemp. from Morro Beach, California.

H. SCHLESCH. Nine marine shells from Greenland.

SENCKENBERGISCHES MUSEUM (exchange). Twelve European land shells.

H. ST. JOHN. *Lymnaea s. wasatchensis* Hemp. from Horseshoe Lake, Washington.

DR. W. STONE. *Crepidula fornicata* L. from Cape May, New Jersey.

A. M. STRONG. Seventeen lots of marine shells from California.

DR. W. R. TAYLOR. Sixty-nine trays of marine shells from Dry Tortugas, Florida.

D. THAANUM. Ten species of Japanese land shells.

J. W. THOMPSON. *Ampullaria paludosa* Say from New Port Rickey, Florida.

R. H. TREMPER. *Murex c. tremperi* Dall from off Newport, California.

UNIVERSITY OF MICHIGAN. Ninety-eight lots of land shells from British Guiana and Venezuela.

U. S. NATIONAL MUSEUM (exchange). Eleven lots of Mexican land shells.

E. G. VANATTA. Three species of shells.

T. VAN HYNING. Seven land shells from Florida.

G. VAN INGEN. A collection of shells from New York.

DR. L. M. VEGA. Six Mexican shells.

PROF. A. E. VERRILL. *Rocellaria lamellata* Desh. from Honolulu.

PROF. F. VON ESCHEN. Three Oregon marine shells.

PROF. H. VON IHERING. Five South American land shells.

S. C. WADMOND. *Planorbis parvus* Say from Racine, Wisconsin.

DR. B. WALKER. Six African land shells.

W. H. WEEKS. Six Peruvian land shells.

R. W. WEHRLE. *Polygyra dentifera* Binn. from Indiana, Pennsylvania.

C. E. WHITE. Seventy-six lots of marine shells from California.

O. S. WHITE. Nine species of land shells from Porto Rico, West Indies.

REV. C. B. WILLIAMS. *Succinea* from near Goliad, Texas.

A. W. WOODBURY. Ten trays of shells from Utah.

J. ZETEK. Seventeen lots of Panama shells.

OTHER INVERTEBRATES

J. W. ADAMS. *Balanus improvisus* Darw. from Fortesque, New Jersey.

C. M. B. CADWALADER. Three barnacles from North Carolina.

PROFESSOR F. ESCHEN. *Leptasterias aequalis* from Newport, Oregon.

DR. F. FELIPPONE. Four barnacles from Uruguay.

DR. H. LUEDERWELDT. Eight barnacles from Brazil.

J. G. MALONE. Two species of *Balanus* from Oregon.

S. R. ROBERTS. Two barnacles from Massachusetts.

H. SCHLESCH (Exchange). *Balanus balanus* L. from Godhaab, Greenland.

U. S. NATIONAL MUSEUM. Three South American barnacles.

PROFESSOR A. E. VERRILL. Two Hawaiian barnacles.

C. E. WHITE. Four brachiopods from California.

DR. H. B. YOCUM. *Velella mutica* from Coos Bay, Oregon.

PLANTS

J. W. ADAMS. Fifty plants, chiefly from Cumberland County, New Jersey.

C. G. ARMSTRONG. *Campanula rotundifolia* from Shawnee, New Jersey.

ROBERT H. ARMSTRONG, JR. *Penstemon digitalis* from Spring House, Pennsylvania.

W. W. ASHE. Specimens of *Fraxinus profunda*.

H. B. BAKER. Seventeen specimens, chiefly Scrophulariaceae, from eastern Mexico.

EDWIN B. BARTRAM. Twelve thousand specimens from the United States and Canada.

GEORGE W. BASSETT. One hundred specimens from Pennsylvania and New Jersey.

RUSSELL BEBLER. Fifty horticultural plants.

WALTER M. BENNER. Two hundred specimens, chiefly from Bucks County, Pennsylvania.

DR. S. F. BLAKE. *Penstemon digitalis* from Maryland.

MRS. HUGH P. BRINTON. Five plants from Chester County, Pennsylvania.

O. H. BROWN. Fruiting specimen of *Ficus pumila* from cultivation.

CALIFORNIA ACADEMY OF SCIENCES. Two Scrophulariaceae, collected by I. M. Johnston in Lower California.

DR. CHARLES J. COLE. Ten specimens from Bogue Island, North Carolina.

CORNELL UNIVERSITY. Sixty-three Scrophulariaceae, collected by Mrs. A. L. Grant in California.

JOSEPH CRAWFORD. Forty-nine plants from Chatham County, Georgia.

CHARLES C. DEAM. One hundred and sixteen specimens from Indiana.

ROBERT R. DREISBACH. Five hundred specimens from Philadelphia local flora; and forty-eight specimens from various parts of the United States.

H. L. FISHER. *Cardamine pratensis* and *Scilla sibirica* from Hunterdon County, New Jersey.

MISS S. G. FISHER. A collection of plants from North Carolina.

JOHN M. FOGG, JR. Fifty specimens from Philadelphia local flora.

DR. C. D. FRETZ. One hundred specimens from Bucks and Montgomery Counties, Pennsylvania.

PROFESSOR A. O. GARRETT. Seven Scrophulariaceae from Utah.

DR. J. R. HAINES. *Lacinaria graminifolia* from Mt. Holly, New Jersey.

MORGAN HEBARD. Nineteen specimens from various parts of the United States.

GEORGE JOHNSON. *Aplectrum hyemale* from Delaware County, Pennsylvania.

MISS HILDA KAJI. Fifty specimens from Philadelphia local flora area.

ROYAL BOTANIC GARDENS, KEW, ENGLAND. Seventy-six Scrophulariaceae from Cornwall, England, collected for us by E. Thurston.

MISS NATALIE B. KIMBER. Fifteen ferns from Arizona.

PROFESSOR W. A. KLINE. *Geranium pusillum* from Collegeville, Pennsylvania.

HENRY A. LANG. Fifty plants from Wissahickon Valley, Philadelphia.

ARTHUR N. LEEDS. Five specimens from New Jersey, Pennsylvania and Maine.

BAYARD LONG. One thousand specimens from Newfoundland; also one thousand specimens from New Jersey, Pennsylvania, Delaware and Maryland.

MRS. A. C. MACBRIDE. *Heteromeles arbutifolia* from California.

FRED MACDOWELL. Twenty-five specimens from Laurelton, New Jersey.

SAMSON MACDOWELL. Fifteen specimens from Torresdale, Philadelphia.

DR. H. B. MEREDITH. Six hundred and eighty-eight specimens from various parts of the United States; also two hundred and fifty specimens collected by Professor T. Tanaka in Japan.

UNIVERSITÉ DE MONTREAL. Six hundred and ninety-four specimens collected by Frere Marie-Victorin in Quebec.

MISS A. ISABEL MULFORD. One hundred and twenty-six Scrophulariaceae from the western United States.

NEW YORK BOTANICAL GARDEN. Four hundred and seventy-five specimens from the United States and West Indies.

THOMAS O'NEIL. *Gentiana saponaria* from Grenloch, New Jersey.

JESUS G. ORTEGA. Thirty-five plants from Sinaloa, Mexico.

GEORGE E. OSTERHOUT. Two Scrophulariaceae from Colorado.

ERNEST J. PALMER. Thirteen Scrophulariaceae from the West Gulf States.

T. CHALKLEY PALMER. *Vaccinium stamineum* from Chester County, Pennsylvania.

DR. F. W. PENNELL. Sixty-four specimens from Toronto, Ontario; seventeen specimens from Seneca and Tompkins County, New York; and one hundred local plants.

DR. HENRY A. PILSBRY. Three specimens from Ringling, Montana.

HAROLD W. PRETZ. Five hundred specimens from Lehigh and Northampton Counties, Pa., and also fifteen specimens from Maine.

GEORGE REDLES. *Rosa palustris* from the Pocono, Pennsylvania.

UNION OF SOUTH AFRICA, DIVISION OF BOTANY. One hundred and four specimens from South Africa.

LEE SOWDEN. Seventy-four specimens from Virginia and West Virginia.

HUGH E. STONE. Four hundred specimens from southeastern Pennsylvania; also 15 specimens from Greene and Orange Counties, New York.

DR. WITMER STONE. Twenty-three specimens from Wisconsin; and a specimen of *Chamaecyparis* from New Hampshire.

ROBERT R. TATNALL. Specimen of *Madia* from Wilmington, Delaware.

UNIVERSITY OF TORONTO. Twenty-two Scrophulariaceae from Ontario.

WILLIAM TRIMBLE. Ten plants from Chester County, Pennsylvania.

UNITED STATES AGROSTOLOGICAL HERBARIUM. One hundred and eight grasses from North and South America.

UNITED STATES NATIONAL MUSEUM. Seventy Scrophulariaceae collected by J. T. Rock and R. C. Ching in China; nine Scrophulariaceae from Peru and Chile; and twelve plants collected by E. P. Killip in the eastern U. S. and Jamaica.

UNIVERSITETETS BOTANISKE MUSEUM, COPENHAGEN, DENMARK. Two hundred specimens from Greenland, Iceland and Jan Mayen.

S. S. VAN PELT. *Styrax obassia* from cultivation.

UNIVERSITY OF WASHINGTON. Two hundred plants collected by J. M. Grant on Mt. Rainier, Washington.

J. B. E. WERNECKE. Two species of *Penstemon* (Scrophulariaceae) from Nebraska.

DR. EDGAR T. WHERRY. Twenty-four Scrophulariaceae, chiefly *Chelone*, from North Carolina, Virginia and West Virginia.

REV. C. B. WILLIAMS. One hundred and thirty plants from Goliad, Texas.

MISS MARY H. WILLIAMS. Twenty-five specimens from Chester County, Pennsylvania; and a collection of plants from Florida.

UNIVERSITY OF WYOMING. One hundred and fourteen specimens collected by E. B. and L. B. Payson in Wyoming.

MINERALS

DANIEL M. BARRINGER. Specimens of Cinnabar, Guiana.

HENRY GOLDSMITH. Collection of Minerals of late Dr. Edward Goldsmith, Beck petrographic microscope and accessories. Dancer microscope with two objectives. Blow pipe apparatus, microscopic sections of rocks, miscellaneous apparatus.

ESTATE OF EDWARD GOLDSMITH. Portrait of Edward Goldsmith.

DR. A. R. RENNINGER. Two specimens of Limonite concretions, New Jersey.

T. F. TAYLOR. Collection of Ores and Minerals.

DR. EDGAR T. WHERRY. Specimen allanite, Pennsylvania.

H. L. WILLIG. Quartz Crystal, Pennsylvania.

ESTATE OF HAROLD WINGATE. Three microscopes and accessories.

MISCELLANEOUS

S. P. CALL. Centenial Exposition Medal.

FOSSIL VERTEBRATE

W. C. KISSINGER. Mammoth tooth (*Elephas primigenius*).

FOSSIL INVERTEBRATES

DR. H. B. BAKER. One *Arca* from Curacoa Id.

S. J. BUNTING, JR. *Gryphaea convexa* Say from Salem River, N. J.

H. GOLDSMITH. The Edward Goldsmith collection of fossils.

H. CARVILL LEWIS ESTATE. Several collections from Europe and North America.

SENCKENBERGISCHES MUSEUM (Exchange). Ten trays of European Pupillidae.

H. E. WANNER. Triasic Unionidae from York County, Pennsylvania.

ARCHAEOLOGY

MISS GERTRUDE ABBOTT. Pouch and cradle (model), Lapp. Head-kerchief, silver buttons and ring, Norwegian peasant. Birchbark mats, Russian Finnland. Sleeping mat, Madagascar.

JOSEPH ADAMS. Discoidal stone, Gloucester Co., N. J.

JORIAH L. BAILY. Sherd and obsidian flake, Guatemala. Metal token, Salvador.

JOSEPH F. EAGAN. Arrow points, Ridley Park, Penna.

C. T. GARBER. Snow shoes, Yukon R., Alaska.

ESTATE OF H. CARVILL LEWIS. Bones of a child, two human crania with parts of skeleton, bones of Virginia Deer, turkey etc. Eight trays of Indian arrow points, potsherds and shells, Saltville, Va. Stone pestle, Radnor, Pa. Axehead, Great Aughwick Creek, Pa. Indian implements, sherds and wampum, Brandywine Creek, Pa. Sherds, Cahokia Mound, Ill. Sioux scalplock. Neolithic celt, Denmark. Bracelet and mummified alligator, Egypt.

JOHN P. MACBEAN. Box of Indian bones, Florida.

J. G. MALONE. Shells from an Indian mound, Newport, Oregon.

S. H. MASKERS. Fragments of clay hut wall, mound, Arkansas

H. A. PILSBRY. Basket, Hawaii.

DR. CASEY WOOD. Palm-leaf book medical literature of 17th century, Candia, Ceylon.

American and Foreign Institutions or Organizations with which the Academy is or Recently has been Cooperating

AGRICULTURAL EXPERIMENT STATION OF THE UNIVERSITY OF MONTANA, BOZEMAN, MONTANA.
ALBANY MUSEUM, GRAHAMSTOWN, SOUTH AFRICA.
AMERICAN ASSOCIATION OF MUSEUMS.
AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK, N. Y.
ARNOLD ARBORETUM OF HARVARD UNIVERSITY, CAMBRIDGE, MASS.
AUSTRALIAN MUSEUM, SYDNEY, AUSTRALIA.
BERLIN BOTANICAL GARDEN, BERLIN, GERMANY.
BERNICE PAUAHI BISHOP MUSEUM, HONOLULU, HAWAII.
BOMBAY NATURAL HISTORY SOCIETY, BOMBAY, INDIA.
BOSTON SOCIETY OF NATURAL HISTORY, BOSTON, MASS.
BOYCE THOMPSON INSTITUTE FOR PLANT RESEARCH, YONKERS, NEW YORK.
BRITISH MUSEUM (NATURAL HISTORY), LONDON, ENGLAND.
BROOKLYN BOTANIC GARDEN, BROOKLYN, NEW YORK.
BUFFALO SOCIETY OF NATURAL HISTORY, BUFFALO, NEW YORK.
BUNSTER AGRICULTURAL INSTITUTE, ANGOL, CHILE.
CALIFORNIA ACADEMY OF SCIENCES, SAN FRANCISCO, CALIFORNIA.
CANADIAN DEPARTMENT OF AGRICULTURE.
CARNEGIE MUSEUM, PITTSBURGH, PA.
CHARLESTON MUSEUM, CHARLESTON, S. C.
COLORADO STATE MUSEUM, DENVER, COLORADO.
COLUMBIA UNIVERSITY, NEW YORK, N. Y.
CORNELL UNIVERSITY, ITHACA, N. Y.
DEPAUW UNIVERSITY, GREENCASTLE, INDIANA.
DURBAN MUSEUM, DURBAN, SOUTH AFRICA.
EWING CHRISTIAN COLLEGE, ALLAHABAD, INDIA.
FIELD MUSEUM OF NATURAL HISTORY, CHICAGO, ILLINOIS.
FLORIDA STATE GEOLOGICAL SURVEY.
GEOLOGICAL SURVEY OF CANADA.
GEOLOGICAL SURVEY OF INDIA.
GEOLOGICAL SURVEY OF NEW SOUTH WALES.
GEOPHYSICAL LABORATORY OF THE CARNEGIE INSTITUTION, WASHINGTON, D. C.
GORDON COLLEGE, RAWALPINDI, INDIA.
GOVERNMENT OF THE ANGLO-EGYPTIAN SUDAN, KHARTOUM, SUDAN.
GOVERNMENT MUSEUM, MADRAS, INDIA.
GRAY HERBARIUM, HARVARD UNIVERSITY, CAMBRIDGE, MASS.
GRINNELL COLLEGE, GRINNELL, IOWA.
HARVARD UNIVERSITY, CAMBRIDGE, MASS.
HAWAIIAN SUGAR PLANTERS' ASSOCIATION, HONOLULU, HAWAII.

HUNGARIAN NATIONAL MUSEUM, BUDAPEST, HUNGARY.
ILLINOIS STATE NATURAL HISTORY SURVEY, URBANA, ILLINOIS.
INDIANA STATE DIVISION OF FORESTRY.
INDIAN DEPARTMENT OF AGRICULTURE, PUSA, INDIA.
INDIAN MUSEUM, CALCUTTA, INDIA.
INSTITUTE FOR GENERAL BOTANY, HAMBURG, GERMANY.
INSTITUTO DE LA SALLÉ, BOGOTÁ, COLOMBIA.
IOWA STATE COLLEGE, AMES, IOWA.
LEHIGH UNIVERSITY, BETHLEHEM, PA.
KANSAS STATE AGRICULTURAL COLLEGE, MANHATTAN, KANSAS.
KARLOVA UNIVERSITA, PRAG, CZECHOSLOVAKIA.
KEW BOTANICAL GARDENS, KEW, ENGLAND.
MICHIGAN AGRICULTURAL COLLEGE, EAST LANSING, MICHIGAN.
MILWAUKEE PUBLIC MUSEUM, MILWAUKEE, WIS.
MINERALOGICAL AND GEOLOGICAL MUSEUM OF THE UNIVERSITY OF COPENHAGEN, COPENHAGEN, DENMARK.
MINERALOGICAL MUSEUM OF THE ACADEMY OF SCIENCES, LENINGRAD, RUSSIA.
MINERALOGICAL SOCIETY, LONDON, ENGLAND.
MINERALOGICAL SOCIETY OF AMERICA.
MISSOURI BOTANICAL GARDEN, ST. LOUIS, MISSOURI.
MUSEUM OF COMPARATIVE ZOÖLOGY, CAMBRIDGE, MASSACHUSETTS.
MUSEUM OF VERTEBRATE ZOOLOGY OF THE UNIVERSITY OF CALIFORNIA, BERKELEY, CALIFORNIA.
MUSEUM OF ZOOLOGY, UNIVERSITY OF MICHIGAN, ANN ARBOR, MICHIGAN.
NATAL FISHERIES COMMISSION, DURBAN, SOUTH AFRICA.
NATAL MUSEUM, PIETERMARITZBURG, SOUTH AFRICA.
NATIONAL ENTOMOLOGICAL MUSEUM, BERLIN-DAHLEM, GERMANY.
NATIONAL GEOGRAPHIC SOCIETY.
NATIONAL MUSEUM, SAN JOSÉ, COSTA RICA.
NATIONAL MUSEUM OF NATURAL HISTORY, PARIS, FRANCE.
NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
NATURAL HISTORY MUSEUM, GENEVA, SWITZERLAND.
NATURAL HISTORY MUSEUM, SAN DIEGO, CALIFORNIA.
NATURAL HISTORY MUSEUM, VIENNA, AUSTRIA.
NEW YORK ACADEMY OF SCIENCES, NEW YORK, N. Y.
NEW YORK BOTANICAL GARDEN, NEW YORK, N. Y.
NEW YORK MINERALOGICAL CLUB, NEW YORK, N. Y.
NEW YORK STATE MUSEUM, ALBANY, NEW YORK.
NEW YORK ZOOLOGICAL SOCIETY, NEW YORK, N. Y.
NORTH DAKOTA AGRICULTURAL COLLEGE, FARGO, N. D.
OHIO STATE UNIVERSITY, COLUMBUS, OHIO.
OXFORD MUSEUM, OXFORD, ENGLAND.
PAULISTA MUSEUM, SÃO PAULO, BRAZIL.
PENNSYLVANIA STATE GEOLOGICAL SURVEY.
PRINCETON UNIVERSITY MUSEUM, PRINCETON, N. J.
QUEENSLAND MUSEUM, BRISBANE, QUEENSLAND.

RAFFLES MUSEUM, SINGAPORE, STRAITS SETTLEMENTS.
RHODESIA MUSEUM, BULAWAYO, RHODESIA.
ROCHA MUSEUM, CEARÁ, BRAZIL.
ROYAL AUSTRALIAN ORNITHOLOGICAL UNION.
ROYAL DANISH GOVERNMENT.
ROYAL NATURAL HISTORY MUSEUM, STOCKHOLM, SWEDEN.
ROYAL ONTARIO MUSEUM OF MINERALOGY, TORONTO, CANADA.
SMITHSONIAN INSTITUTION, WASHINGTON, D. C.
SOUTH AFRICAN MUSEUM, CAPE TOWN, SOUTH AFRICA.
SOUTH DAKOTA STATE COLLEGE, BROOKINGS, SOUTH DAKOTA.
SOUTHWEST MUSEUM, LOS ANGELES, CALIFORNIA.
STANFORD UNIVERSITY, STANFORD UNIVERSITY, CALIFORNIA.
TRANSVAAL MUSEUM, PRETORIA, SOUTH AFRICA.
UNITED STATES BIOLOGICAL SURVEY.
UNITED STATES BUREAU OF CHEMISTRY.
UNITED STATES BUREAU OF FISHERIES.
UNITED STATES BUREAU OF PLANT INDUSTRY.
UNITED STATES FOREST SERVICE.
UNITED STATES GEOLOGICAL SURVEY.
UNITED STATES NATIONAL MUSEUM.
UNIVERSITY OF CALIFORNIA, BERKELEY, CALIFORNIA.
UNIVERSITY OF CALIFORNIA (SOUTHERN BRANCH), LOS ANGELES, CALIFORNIA.
UNIVERSITY OF GEORGIA, ATHENS, GEORGIA.
UNIVERSITY OF ILLINOIS, URBANA, ILLINOIS.
UNIVERSITY OF KANSAS, LAWRENCE, KANSAS.
UNIVERSITY OF KENTUCKY, LEXINGTON, KENTUCKY.
UNIVERSITY OF MANITOBA, WINNIPEG, MANITOBA, CANADA.
UNIVERSITY OF MICHIGAN, ANN ARBOR, MICHIGAN.
UNIVERSITY OF MINNESOTA, MINNEAPOLIS, MINN.
UNIVERSITY OF NEBRASKA, LINCOLN, NEBRASKA.
UNIVERSITY OF PENNSYLVANIA, PHILADELPHIA, PA.
UNIVERSITY OF ROCHESTER, ROCHESTER, NEW YORK.
UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES, CALIFORNIA.
UNIVERSITY OF TENNESSEE, KNOXVILLE, TENNESSEE.
UNIVERSITY OF TORONTO, TORONTO, CANADA.
UNIVERSITY OF VIENNA, VIENNA, AUSTRIA.
UNIVERSITY OF WISCONSIN, MADISON, WISCONSIN.
UNIVERSITY OF WYOMING, LARAMIE, WYOMING.
VICTORIA MEMORIAL MUSEUM, OTTAWA, CANADA.
WELLCOME RESEARCH LABORATORY, KHARTOUM, SUDAN.
WISTAR INSTITUTE OF ANATOMY AND BIOLOGY, PHILADELPHIA, PA.
YALE UNIVERSITY, NEW HAVEN, CONNECTICUT.
ZOOLOGICAL MUSEUM, BERLIN, GERMANY.
ZOOLOGICAL MUSEUM, BUITENZORG, JAVA.
ZOÖLOGICAL SOCIETY OF PHILADELPHIA, PHILADELPHIA, PA.

The Academy has extended the privilege of regularly meeting within its buildings to the following organizations:

AMERICAN ENTOMOLOGICAL SOCIETY
DELAWARE VALLEY ORNITHOLOGICAL CLUB
LEIDY MICROSCOPICAL CLUB
PHILADELPHIA BOTANICAL CLUB
PHILADELPHIA MINERALOGICAL SOCIETY

Report of the Librarian

The total additions to the library in 1926 number 8,097, as follows:

Pamphlets and Parts of Periodicals	7378
Volumes	626
Maps	93

These came from the following sources:

Exchanges	4211
Isaiah V. Williamson Fund	2485
United States Department of Agriculture	542
General Appropriation for the Purchase of Books	103
Editors	78
Authors	60
John Aitken Meigs Fund	46
United States Treasury Department	42
Indian Institute of Science	37
Texas Agricultural Experiment Station	36
Pennsylvania State Library	35
New York State College of Agriculture	31
Brazil. Serviço Geologico e Mineralogico do Brasil	21
Museum of the American Indian, Heye Foundation	19
New Jersey Department of Agriculture	16
Publication Committee of the Academy	16
United States Department of Commerce	13
Cornell University Agricultural Experiment Station	12
National Association of Marble Dealers	12
Illinois State Geological Survey	11
Cleveland Museum of Natural History	10
Vermont Agricultural Experiment Station	10
American Entomological Society	9
Chemical Society of Japan	9
Pennsylvania Museum	9
Geologiska Kommission i Finland	8
New York State Agricultural Experiment Station	8
Roosevelt Wild Life Experiment Station	8
Thomas B. Wilson Fund	8
Alabama Geological Survey	7
Indiana University	7
National Academy of Sciences	7
Société Préhistorique Française	7
Utah Agricultural Experiment Station	7

Baylor University Museum	6
Pennsylvania Forestry Association	6
Witmer Stone	6
Henry Winsor	6
Australian National Research Council	5
Colorado Historical and Natural History Society	5
Trustees of the British Museum	5
Alabama Department of Archives and History	4
Government of India	4
Harvard Institute for Tropical Biology and Medicine	4
Maryland Academy of Sciences	4
William J. Fox	3
Natural History Museum, San Diego	3
Henry A. Pilsbry	3
Rockefeller Foundation	3
United States War Department	3
Zoological Society of Philadelphia	3
American Alpine Club	2
Morris M. Green	2
California State Department of Agriculture	2
Comité Spécial du Katanga	2
Charles Hedley	2
Kentucky Geological Survey	2
Louisiana Department of Conservation	2
Ministère des Colonies, Belgium	2
Mexico Secretario de Agricultura y Fomento	2
Nigeria Geological Survey	2
Pan-Pacific Science Congress	2
Philadelphia Museums	2
Seale-Hayne Agricultural College	2
South Dakota Geological Survey	2
Tennessee Geological Survey	2
Academy of Science and Art of Pittsburgh	1
Agricultural Experiment Station, West Virginia University	1
Aluminum Wares Association, Chicago	1
Amgueddfa Genedlaethol Cymru (National Museum of Wales)	1
Associated Mountaineering Clubs of North America	1
Association Impériale pour l'Encouragement des Inventions	1
Australia Department of Trade and Customs	1
Board of Water Supply of the City of New York	1
Bristol Museum and Art Gallery	1
Colorado Museum of Natural History	1
Colorado State Agricultural College	1
Cushman Laboratory of Foraminiferal Research	1
Delaware Valley Ornithological Club	1
Roy E. Dickerson	1

Direccion de la Edicion Oficial de las Obras y Correspondencia Cientifica de Florentino Ameghino 1
Georgia Geological Survey 1
Samuel G. Gordon 1
Morgan Hebard 1
Howard University 1
India. Imperial Entomologist 1
Louisiana State Museum 1
Massachusetts. Commissioner on Fisheries and Game 1
Mechanics Institute, San Francisco 1
Mexico. Direccion de Estudios Geográficos y Climatólogices 1
Mexico. Secretario de Educacion Publica 1
Michigan Geological and Biological Survey 1
Mississippi State Geological Survey 1
Clarence B. Moore 1
Nantucket Maria Mitchell Association 1
National Association of Audubon Societies 1
National Research Council 1
Nela Research Laboratory 1
New South Wales Fisheries 1
Newark Museum 1
North Carolina Department of Conservation and Development 1
Oakland Free Library 1
Ohio Northern University 1
Henry D. Paxson 1
Francis W. Pennell 1
Royal Zoological and Acclimatisation Society of Victoria 1
San Diego Society of Natural History 1
Mary A. Schively 1
Scientific Society of San Antonio 1
Scripps Institution for Biological Research 1
Henry W. Shoemaker 1
Southwest Museum 1
Union of South Africa. Fisheries and Marine Biological Survey 1
University of British Columbia 1
W. S. Wadsworth 1
Wild Flower Preservation Society 1
R. C. Williams, Jr 1
Wistar Institute of Anatomy, etc 1

Nine hundred and forty-six have been bound. Thirty-eight volumes and 259 pamphlets, not in line with the Academy's interests, were transferred to the Free Library of Philadelphia.

Forty-eight volumes were taken out by members, the reduction being due to a rule adopted against loaning works of reference.

Fifteen hundred and ninety-eight were used on the premises by the scientific staff. No statistics were kept as to the books used in the reading room but such use has been on the increase for several years.

The following journals and transactions, new to the library were acquired by purchase or exchange:

Abriss der Geologie Bayern r. d. Rhein.
Academia das Sciencias de Lisboa. Actas das Assembleas Geraes.
Academie des Sciences, Arts et Belles Lettres de Dijon. Bulletin Mensuel.
Académie des Sciences de l'Oukraine. Mémoires (Trudy).
Acta Botanica Fennica, Helsingfors.
K. Akademie in Braunsberg. Arbeiten aus den Botanischen Institut.
Annali di Scienze e Lettere, Milano (1810–12).
Arcana; or the Museum of Natural History (1819–11).
Archives d'Histoire Naturelle.
Associated Mountaineering Clubs of North America. Bulletin.
Beiträge aus der Tierkunde.
Beiträge zur Botanischen Protistologie.
Beiträge zur Geologie von Thüringen.
Bialowieza.
Biologische Oka-Station zu Murom. Arbeiten.
Biologiské Listy.
Canada Department of Mines. Economic Geology Series.
Ceylon Journal of Science, Section C.—Fisheries.
Chemical Society of Japan. Journal.
Cleveland Museum of Natural History. Pocket Natural History.
Colorado State Agricultural College. Occasional Papers from the Museum of Zoology and Entomology.
Comite d'Études Historiques et Scientifiques de l'Afrique Occidentale Française. Bulletin.
Congresso Botanico Internazionale di Genova. Atti.
Conseil Permanent pour l'Exploration de la Mer. Journal.
Dansk Ornithologisk Forenings Tidsskrift.
Deutsches Meteorologisches Jahrbuch Freie Hansestadt Bremen.
Entomological Society of London. Proceedings.
Finland. Suomen Geologinen Kommissioni. Agreogeologisia Julkaisija.
Geologica Hungarica.
Gesellschaft für Botanik, Hamburg. Berichte.
Gesellschaft für Deutsche Vorgeschichte. Nachrichtenblatt.
Gesellschaft für Förderung der naturhistorischen Erforschung des Orients in Wien. Jahresbericht.
Gosudarstvennogo Irkutskogo Universiteta. Sbornika Trudov.
Grossherzoglich hessische geologische Landesanstalt zu Darmstadt. Abhandlungen.

Harvard Institute for Tropical Biology and Medicine. Contributions.
Hilgardia.
Hull Scientific and Field Naturalists' Club. Transactions.
Illinois State Geological Survey. Press Bulletin Series, Illinois Petroleum.
Imperial Botanical Conference. Report of Proceedings.
Imperial University of Tokyo. Journal of the Faculty of Science, Series I–V.
Indian Institute of Science. Journal.
Institut Española de Océanografia. Bulletin de Pescas.
Institut Hydrologique, Leningrad. Mémoires.
Institut Hydrologique de Russie. Bulletin; Études de la Neva et son Bassin; Explorations des Mers Russes.
Institut Scientifique Lesshaft. Bulletin.
Instituto Brasileiro de Sciencias. Boletim.
Instituto Español de Oceanografia. Memorias.
International Conference of Phytopathology and Economic Entomology. Report.
Italy. R. Ufficio Geologico. Memorie descrittive della Carta Geologica d'Italia.
Jahresberichte über die Deutsche Fischerei.
Jardin Botanique do Rio de Janeiro. Contributions.
Johns Hopkins University Studies in Geology.
Junta para Ampliacion de Estudios e Investigaciones Cientificas, Madrid. Anales.
Laboratoire Biologique de St. Pétersbourg. Bulletin.
Latvijas Universitates Botaniska Darzā Rāksti (Hortus Botanicus Universitatis Latviensis.)
Leidische Geologische Mededeelingen.
Leopoldina. Berichte der kaiserlich-deutschen Akademie der Naturforscher zu Halle.
Masarykova Universita. Spisy Lekarské Fakulta.
Missouri Botanical Garden. Bulletin.
Monographien zur Geologie und Palaeontologie.
Moravské Prirodovedecké Spolecnosti. Prace.
Mount Desert Island Biological Laboratory Weir Mitchell Station. Contributions.
Musée de l'État de la Region Industrielle Centrale, Moscou. Mémoires.
Muséum de Géorgie, Tiflis. Bulletin; Travaux.
Muzeum im. Dzieduszyckich, Lemberg. Rozpravy i Wiadosmosci.
Nachrichtenblatt für deutsche Vorzeit.
National Botanic Gardens of South Africa. Report.
National Parks Association. Bulletin.
Natural History Museum Bulletin, San Diego.
Natural History Society of Siam. Journal.
Nauchrujkh Rabot Kievskogo Obshchestva Estestvoispytatelei. Sbornik. (Société des Naturalistes de Kiew, Recueil des Travaux Scientfiques).
Nederlandsch-Indisch Natuurwetenschappelijk Congres. Handelingen.
New York Academy of Sciences. Occasional Papers.
Norsk Videnskaps-Akademien i Oslo. Arbok; Avhandlinger; Skrifter.

K. Norske Videnskabers Selskab. Nya Samlyng . . . Skrifter (1784–88); Nyeste Samling . . . Skrifter (1798).
Oakland Free Library. Report.
Observatoire d'Utrecht. Recherches astronomiques.
Observatorio Meteorológico e Magnetico de Coimbra. Observaçoes Meteorológicas, Magneticas e Sismológicas.
Peking Society of Natural History. Educational Series.
Pennsylvania Alpine Club. Wild Life Bulletin.
Physiographiske Kommission, Lemberg. Sammelschrift.
Quarterly Review of Biology.
Revista Medico-Chirurgicola din Iasi (Bulletin al Societatea de Medici si Naturalisti).
Saito-Ho-on Kai, Sendai. Annual Report; Monographs Reprint Series.
Sbornfk Prirodovedecky, Prag.
Schriften für Süsswasser- und Meereskunde.
Seale-Hayne Agricultural College. Annual Report Department of Plant Pathology.
Selsko-Khoziastrenoi Akademii, Omsk. Trudy.
Serviço Geologico e Mineralógico do Brazil. Boletim; Relatorio.
Siam Society. Journal, Natural History Supplement.
Società Entomologica Italiana. Memorie.
Société Archéologique Historique et Géographique du Department de Constantine. Recueil des Notices et Mémoires.
Société Entomologique de Belgique. Bulletin et Annales.
Société Linnéene de Paris. Bulletin.
Société d'Études Scientifiques de Paris. Bulletin.
Société d' Histoire Naturelle de Savoie. Compte Rendu sommaire des Séances.
Société des Amis des Sciences Naturelles d'Anthropologie et d'Ethnographie, Moscow. Mémoires (Sections Botanique, Ethnographique, Géographique Géologique, et Physiologique); Otchet (Report); Bulletin Station Biologique du Gouvernement de Moscou.
Société des Naturalistes de Voronèje. Bulletin.
Stadtliche Stelle für Naturschutz beim Württ. Landesamt für Denkmalpflege. Veröffentlichungen.
Statensförsöksanstalt Stockholm. Exkursionsledare; and Skogliga Rön.
Tierwelt der Nord- und Ostsee.
Tiflis Botanical Garden, Phytopathological Laboratory [Publication].
Tomskogo Gosudarstvennogo Universiteta. Izviestia (Tomsk State University; Transactions).
Towarzystwa Przyjaciól Nauk w Wilnie. Prace Wydzial Nauk Matemat. i Przyrodniczych.
Trabajos de Oceanografia y Biologia marina, Madrid.
Trillia.
Tübinger Naturwissenschaftliche Abhandlungen.
Ukrainian Botanical Review (In: Mémoires Académie Sciences Oukraine).
Ukrainian Zoological Magazine.

Ukrainiska Akademia Nauk. Zvidomlennia.
Universidad Mayor de San Marcos de Lima. Boletin bibliografico; and Revista universitaria.
Universidade de Coimbra, Museu Mineralógico e Geologico. Publiçacaoes: Memorias e Noticias.
Universität Graz. Arbeiten des Phytopalaeontologischen Laboratoriums.
Universität Innsbruck. Arbeiten aus dem Zoologischen Institut.
Université de Louvain. Publications, Laboratoire d'Astronomie; and Laboratoire de Chemie générale. Travaux Institut de Bactériologie.
Université de Montréal. Contributions du Laboratoire de Botanique.
University College of Wales Department of Zoology. Report on Marine and Fresh Water Investigations.
University of Chicago. Abstracts of Theses Science Series.
University of Liverpool Department of Geology. Papers.
University of Michigan. Michigan Handbook Series.
University of Manchester Publications Biological Series.
University of Missouri Studies.
University of Nebraska. Bibliographical Contributions; Studies from the Zoological Laboratories.
University of Oregon. Publication, Physical Education; Publications in Geology Series.
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Vysoké Skoly Zemedélské v Brné. Sbornik Fakulta hospodárská; Sbornik Fakulta Lesnická.
Wagner Free Institute of Science. Bulletin.
West China Border Research Society. Journal.
West Virginia University. Scientific Papers Agricultural Experiment Station.
Zeitschrift für Garten-und Obstbau, Wien.
Zeitschrift für Geomorphologie.
Zeitschrift für Pilzkunde.
Zoological Society of Philadelphia. Bulletin.
Zoologischer Anzeiger. I. Supplementband.
Zoopark of Moscow. Transactions of the Laboratory of Experimental Biology.

The Academy is indebted to Dr. Henry Winsor for paying for the continuation of its copy of "Wilhelm Roux' Archiv der Entwicklungsmechanik der Organismen" from 1924 to date.

The library is coöperating with the new publication "Biological Abrtracts."

Among the important additions are Perry, "Arcana; or the Museum of Natural History," London, 1810–11, probably the

only copy in the United States; and the French edition of Sowerby's "Mineral Conchology," edited by Desor and Agassiz.

I wish to acknowledge my appreciation of the efficient work and help of my colleague, Mr. William J. Fox, Assistant Librarian, and to Miss H. Newell Wardle for valuable assistance.

Respectfully submitted,

SPENCER TROTTER,
Librarian.

Report of the Publication Committee

The volume of the PROCEEDINGS for 1926, about to be issued, will contain 506 pages and forty plates, with a supplement of 228 pages carrying a "Synopsis of North American Diatomaceae," Part I, by Charles S. Boyer, making a total of 734 pages. It is hoped to publish the second and concluding part of Mr. Boyer's paper as a similar supplement to the 1927 volume.

Under the editorship of Dr. Henry A. Pilsbry, Part 108 of the "Manual of Conchology," 201 pages and fifteen colored plates, has been published.

WILLIAM J. FOX,
Secretary of the Committee.

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