AN AUTOBIOGRAPHY

with a historical sketch of the

Founding and Early Development

of the

AMERICAN MUSEUM OF NATURAL HISTORY,

by

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AUTOBIOGRAPHY

of

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(Set 5)

My love for natural history was largely due to the peculiar advantages which characterized my birth-place as an ideal locality for the pursuit of Nature Study.

Half way down the picturesque coast of Maine is the high island of Monhegan, which forms a prominent headland on the chart of all that region. It has a first class light-house which sends its welcome rays over many miles of the wide sea. Twelve miles in a northerly direction that light shines by night over a beautiful sandy beach on the mainland in the town of St. George near the harbor of Martinsville.

A few hundred yards from that ocean shore, stood, up to a few years since, a seaman's dwelling erected nearly a century ago, and for several generations locally known as the "Mansion House", because of its size and complete appointments as compared to the very primitive character of the adjoining dwellings.

In that house I was born on the first day of March, 1839. As soon as I could walk or stand by a window, I learned to watch for Monhegan Light, when the sun had disappared in the west. I was taught to regard that light as a messenger of mercy, for all my male relatives were "seafaring" men and some of them were constantly guided homeward by its friendly aid.

From the rocky point between our beach and the adjoining harbor there came one night, in the midst of a heavy storm, the alarming cry that a vessel of a neighbor had been cast away, and that both ship and crew were in the greatest peril and would be lost unless immediate aid could be rendered. My father and two of his brothers hurried to the scene, and in their anxiety to help, one of these

brothers was swept away by a mighty wave and found a watery grave only a few moments after he had started from our house on his noble errand of mercy. My uncles' heroic death sanctified the cruel ledges, over which we could hear the seas moaning during heavy storms as we sat by our own comfortable fireside. And in like manner every rocky islet and sunken ledge near and far had its own story of shipwreck and of the brave deeds of daring seamen which were especially adapted to arouse a child's imagination and admiration.

Our beach of white sand was, in those days, the most beautiful of any in our part of the coast of Maine, but since that time thousands of cart loads have been taken away and now the receding tide leaves little but banks of shingle. The high headland which bordered the beach on the east was, seventy years ago, covered with a primeval forest of grand old spruce trees, which have long since disappeared. There, on the borders of the woods, many crows built their nests and feasted on the sea-urchins (Echini) which in the summer months abounded in the nooks and basins amid the ocean surf which constantly broke on the rocky cliffs below. The shells of these sea-urchins formed one of the most interesting objects, which we, children, gathered from the abundant fauna of the sea.

Our house was connected by a long shed to a large barn, which had on its side toward the sun and the seashore two and three rows of several hundred nests of the barn swallow, and large flocks of these half tame birds were constantly circling round our home from early spring time till late in the autumn. The neighboring sea abounded with marine life. Great schools of herring, alewives, menhaden, mackerel and pollock came up in the spring and early summer, from out of the deep ocean and swarmed among the islands and into every inlet

and harbor along the shore. Pursuing and preying on them came immense numbers of food fishes like the cod, the hake and the haddock. Seals feasted on these fishes and at low water almost covered the ledges where they were basking in the sunshine. The mackerel catchers then used only hand lines and not the destructive purse seines, which have broken up the former masses of the smaller bait fishes and scattered the important food fishes which then followed them into every small bay.

The harbors then swarmed with such numbers of great lobsters, that while a boy I have many times gathered a bushel of them from their hiding places under rocks and old wrecks in a single low tide. Such splendid specimens could not now be found by searching for them during half a summer.

Our house was located between a forest and the sea. The spruce and fir trees behind it were loaded with cones which furnished an ample supply of food to a colony of red squirrels, and wild rabbits scampered away before us as we followed the narrow and shaded paths through the woods. Each season brought its variety of joys that filled the hours of those happy days.

In spring time with two companions of my own age, we learned where to find the large blue violets and where the small, white, sweet-scented ones abounded on the banks of running brooks. Among other attractive flowers, our especial favorite was the little, delicate and fragrant Twin Flower, which botanists have appropriately named the Linnea, in honor of the great naturalist of Sweden, who founded our science of natural history.

We knew well where the robins and sparrows and many other birds built their nests and reared their young, and we could recognize most

of them by their calls and songs and always, toward sunset listened for the rich liquid notes of the thrushes.

When winter came, its long months were freed from any sense of dulness or loneliness by many peculiar pastimes.

The heavy surf, which broke on our beach, piled up the white sand into a long, low, narrow mound, that held back the surface water and formed behind it a strip of marsh, which was usually overflowed in mid-winter and changed into a shallow pond. This was the favorite gathering place where the boys from the neighboring scattered hamlets assembled on winter evenings for skating. The surf also threw up along the highwater line great quantities of drift wood, that was originally brought down to the ocean from the lumber milles in the interior of the state, by the Penobscot and other rivers. An abundance of dry fuel was thus supplied for bonfires along the borders of the pond and for the burning firebrands which the whirling skaters carried by night in their mimic warfare, as they glided in an intricate maze over the mirror-like surface of the frozen pond.

When deep snows lay spread out over the pastures and fields and the seamen were necessarily confined to their homes by frequent wintry storms, then a grand carnival was held by all the men and boys in our part of the town, in the form of a fox hunt. The whole company at first ranged itself into a long extended line, a mile or more away, and drove the game toward our high, thickly-wooded headland. From our home we could watch their approach and hear the yelping and baying of the dogs, the shouts and strident tin-horns of the boys, and the occasional crack of the rifles of the men. When the hunt was over, all the party marched by our house on their way to the nearest village, and each marksman, who had killed a fox, was permitted to

bear it aloft, in triumph, on the muzzle of his gun as a proof of his successful skill.

The annual migration of the sea birds was a subject of the greatest interest especially that of the Wild Goose, which always flew in triangular lines, and gave a peculiar "honk" announcing far in advance that they were coming. One autumn I saw a flock of over fifty of these wary birds circle round and round and slowly descend until they all alighted in a neighboring cove within easy rifle range of a red school house which was full of pupils at the time. Now these timid birds are only seen flying so high as to be mere specks in the sky. But the special occasion of the year, was when several families of the Penobscot Indians came back to their annual camping place on one of our beaches. They lived at Old Town near Bangor, and migrated each spring along the shore as far west as the vicinity of Portland, returning in the autumn. They came in their own birch-bark canoes and built their wigwams where they and their forefathers had located such encampments for ages. They hunted seals and porpoises and their skill in handling their unsteady boats in high seas, and in stealthily stealing up and attacking their game, were the sources of endless stories which delighted our childish imaginations. The crude appearance of their primitive shelters was in marked contrast with the beautiful baskets of manifold colors which were made by the squaws. Many years ago they all disappeared and even the memories of their former voyages are only perpetuated by the names they have left on the islands and headlands where they formerly made their temporary homes.

The intellectual and social life of the little hamlets of our

coast was confined almost entirely to the church and the school-house. The latter was always painted red, with as rare an exception, as if it had been a requirement enjoined by a mandatory law. Besides the day schools, there were frequently held in the evenings writing schools and singing schools, when some travelling instructor would give special lessons to adults. The school master was a most important member of our community and he was not only permitted but was expected to enforce a strict obedience to his rules by the free use of the ferule. We all experienced a sad lack of library facilities. There were many long winter evenings but there were few or no books to read. In my earliest childhood, when I was to be especially rewarded for studiousness, I was permitted to hold in my hands a little volume which is still open before me, as I write. I have treasured it almost as if it were a sacred relic. Its title reads: "Goldsmith's Natural History, Abridged." The crude illustrations, which especially delighted my childish eyes were those of the various kinds of dogs, squirrels and rabbits and other animals, which I saw every day, and with which I was therefore the most familiar. After more than half a life-time, when it became important for me to lecture on the collections in our Museum of Natural History, I found that these pictures, which had so delighted my earliest childhood, were brought back by memory with photographic distinctness; and this fact led me to adopt the Visual Method of Instruction, to which I have earnestly devoted my energies during the past twenty years.

Every landscape view from our old homestead contained the conspicuous nest of a pair of fishhawks, usually perched on the upper limbs of the highest tree in all the neighborhood, and here, apparently, the same pair returned year after year. As the days and

inlets abounded with fishes, it was a constant delight to watch these birds sailing to and fro until some scaly inhabitant of the deep happened to come near the surface of the water, when the nearest fishhawk would poise itself for a moment, with its wings raised up high above its head, and then plunge down with almost unfailing aim upon its finny prey.

The long heavy swell of the open ocean still breaks on the rugged cliffs, and visitors continue to go to the Spouting Horn, near by, where the waves have bored into a "joint" of the hard rocks and formed an excavation which has an upward vent that gives this locality its appropriate name.

It was an established custom, fifty years ago, to organize, on the Fourth of July, "a sailing party" at each village, and for the whole community to join in the excursion. On one of these occasions we visited the "Little Green Island", which lies near White Head, and is mound like in form and covered only with grass. At that time, it was the home of myriads of gulls and terns, which, as we approached rose in great clouds. I believe there were more of them nesting and living on that one island then than can now be found on the whole Maine coast.

A few years after our visit, the feather hunters appeared and so mercilessly pursued their destructive trade that these birds almost entirely disappeared. Now, thanks to the success of the humane efforts of the Audubon Society, these same species are again frequenting the adjoining localities where they are carefully protected, and competent observers agree that they are manifestly increasing in numbers, and therefore it is possible that the wonderful flights which we saw in former days may be witnessed hereafter by the lovers of wild birds.

On one of these Fourth of July excursions we visited the high island of Monhegan, whose bright light had delighted my earliest childhood. There I found such an abundance of beautiful butterflies which were rare on the mainland, that I lived with a fisherman and collected these beautiful creatures for several days.

In the early 60's I chanced to hear that the famous landscape painter, Mr. F. E. Church, had found scenery on the island of Mount Desert, near us in Penobscot Bay, worthy of his skillful pencil, and I set out to make a foot journey and myself enjoy the attractions of its mountains and rocky shores. It was my good fortune on this occasion to meet and become the travelling companion of Mr. S. S. Thaxter, with whom I also travelled through the White Mountains and visited the Isles of Shoals. When we descended from Green Mountain and came to Bar Harbor we found there only one place where we could lodge and that was little better than a boarding house, and for one thousand dollars more land could then have been purchased, than the owner could have imagined what to do with. Now that hamlet has become a fashionable seaside resort ranking next to Newport, in wealth and social importance, a striking proof of the correctness of Mr. Church's foresight. But all along the coast are many attractive localities where at some future time summer settlements will be made like that on Squirrel Island near the mouth of the Sagadahoc River which flows by the City of Bath, and the facilities for Nature Study which I enjoyed ih my boyhood will benefit many young students of the coming generation.

When I was eight years old, my father, who was Captain of a fine barque took my mother, my sister and myself to Bordeaux, France. Our cargo on the outward voyage was staves and we brought back wines

particularly the claret for which that part of France is famous.

What specially impressed me was the great number of casks filled with wine which occupy the quay as we landed in the city. Then there was always before us the great bridge over the Garonne. It was said to have been built by Napoleon, and was so constructed that a passage under the roadway provided a protected passage for a great number of soldiers to advance or retreat at will and be entirely safe from an enemy. On our national Independence Day, the American Captains, our Consul and those engaged in trade with the United States, held a holiday and banquet in the grounds of a beautiful villa a few miles outside of the city. The trees were grand and the flowers were abundant, but more remarkable seemed to me the carefully trimmed hedges and the rigid regularity of the Italian garden. The carefully kept vineyards on the northern or right bank of the river opposite Bordeaux was a source of constant interest and was frequently visited. On one of these occasions an old peasant woman, who manifested her generous interest in me the child of the party, made vigorous gesticulations to indicate that if I would leave the party and follow her she had something of great importance to show me. She led me a short way through an arbor covered with a grape-vine filled with clusters of ripe fruit and then reaching up to a tree loaded down with yellow prunes that were perfectly ripe, gave the tree a vigorous shake and half a bushel of the delicious fruit fell upon the ground and after she had heaped up on me all that I could carry she filled her apron full and we returned to our party to have them share in the rich results of our discovery.

On the 14th of July the French people commemorating the founding of the Republic had their national holiday and a grand military

parade was held, in an open square near the centre of the city. Two monumental pillars stood on the border where the soldiers entered. In the evening a grand display of fireworks was made on the same plaza. The brilliancey and variety of colors in the set pieces were the remarkable features of the brilliant exhibition. But the experience that most deeply impressed my childish mind was the service in the grand old Cathedral. I had been trained to attend with the greatest sense of devotion our little village church, which stood by itself on an eminence, where the several hamlets of the southern half of our town could most conveniently assemble. In that simple worship our choir was accompanied with a "melodeon". Therefore when we approached the imposing edifice and entered with the grand nave filled with worshippers, while the great organ poured forth its exquisite strains and rolled out its tones of deepest thunder, we beheld in the richly adorned altar with its blaze of lights the scene which gave me the deepest thrill and the one which longest and most clearly remained in my memory. The imposing ritual of this service so deeply impressed me that I still recall its principal features with photographic distinctness, and thus in my own experience was fully accomplished one of the chief purposes of the astute founders of this form of religious worship.

In the year after travelling through Algeria, and Southern France and the Pyrenees, we came to Bordeaux, and I found that I could tell my wife in advance of the relative position of the quay, the bridge, the parage ground and the cathedral, and I verified the correctness of my memory by directing the coachman where to drive that we might revisit those parts of the city which had so deeply impressed me when a child years before.

After having been through the country schools where all subjects from the alphabet to those of the grammar grade were taught at each session by the one teacher, it was my privilege for several terms to attend the academy in the neighboring town of Thomaston. One of the most attractive roadways in any town in Maine is the Main Street of this place on account of its low rows of magnificent elms. In a commanding position on the bank of the Geogres River, was then existing the picturesque mansion of Major General Knox, who was one of Washington's most trusted commanders in the revolutionary war.

At the age of fifteen I journeyed alone in midwinter to Boston, and thence to the granite hills of New Hampshire to the town of New London, thirty miles north of Concord. At this model preparatory school I fitted for college. One of the characteristics of this institution was its distinctly religious character. All the pupils attended the reading of the scriptures and a prayer, with which the duties of the day always began. A mid-week prayermeeting led by one of the students was always well attended. I do not remember that we regarded it as a burdensome rule that we should attend prayers every morning in the chapel, and to go to church on Sundays we considered to be a marked privilege. This religious phase of early education has now unfortunately vanished, even in NewEngland, where it once formed so prominent a characteristic of the training of the youth.

The old academy building in the small village on the New London hill is no longer filled with students from Concord, Nashua, Manchester and other cities, for all these larger places now have well equipped high schools, which are maintained at the expense of the whole community and therefore the tuition is free and in some localities even the necessary books are supplied. In such schools supported

by public taxation only a short chapter of the Bible can be read at the opening exercises of the day, and all prayers have to be dispensed with, and this fact I consider to be one of the reasons why our youth at the present day are growing up with such a complete indifference to all forms of personal religious experience.

The people of New England have always been noted for the intensity of their devotion to the kind of life-work they may have chosen in their early youth, and my observation leads me to believe that one of the chief reasons for the prominent development of this important phase in the character of the descendants of the Pilgrims, and one which has made them to be an acknowledged power, wherever colonies of that people have settled, appears to be largely due to the positive character of their early religious convictions.

My experience as an educator, therefore, goes to show me the great and ever-increasing importance of any plan, which will even, partially, remedy the existing lack of religious instruction in our free public schools, by providing classes out of school hours and on the Sabbath for the illustrated study of the geography and history of Bible lands. Parents, guardians and progressive teachers all, ought to carefully consider this subject, which is one of the gravest problems in our own country and one, which is also at the present time, the all-absorbing public question throughout the British Empire.

Our small class of 1856 at the New London Institution contained the late Reverend A. J. Gordon, D.D., of Boston and the Hon. H.K. Porter of Pittsburgh. As most of my classmates went to Dartmouth College, I followed with them to Hanover and entered the class that graduated in 1860. Our faculty in that honored institution was able, experienced, sympathetic and wisely helpful but our curriculum was of

the rigid, old-fashioned, New England type, in which Latin, Greek and Mathematics were regarded as of special importance and were assigned precedence over all other subjects. We had no electives and our regular course did not include any modern language. If half of the time I was obliged to devote to Greek and Latin had been given to French and German, I would have gained an equal mental training and at the same time have early obtained a partial knowledge of these living languages, which have proved to be constantly useful in my travels and life-long studies.

Our class, which graduated in 1860, had 60 members, and the whole number in the college and its schools was then between 300 and 400. Since that time Dartmouth has enjoyed a rapid and grand development and all the most modern phases of education have been added, and the total attendance has now risen to over one thousand.

My favorite studies were chemistry, geology and mineralogy, and as my home was far away on the coast of Maine I passed the short vacations of spring making journeys on foot in the vicinity of Hanover. One of these excursions took me to the top of Mount Ascutney, where I passed the night alone for the pleasure of seeing the sun set over the Green Mountains in Vermont and rise again over Mounts Kearsarge and Sunapee in New Hampshire, while the Connecticut River which separates these states courses along the eastern side of the mountain on which I stood. From collecting minerals it was easy and natural advance to add specimens of botany and zoology. A former member in the medical faculty was especially interested in insects and as he had a fine horse and carriage we drove together over all that part of the Connecticut Valley and divided our collections, and I used my specimens to ornament my room, which became one of the

show-places of the town. Those drives over that hilly region were especially delightful after the maples, the oaks and the birches and many shrubs had changed their green foliage of summer into the scarlet and purple and gold of autumn. Though I have since travelled throughout a large part of the tropical world I have no where seen such marvelous colors in the forests.

My medical friend and others in the faculty seeing my love for natural history proposed that as I passed through Boston on my way to my home in Maine, I should go out to Cambridge and using the letters of introduction with which they kindly provided me, consult Professor Louis Agassiz, as to the possibility of my studying under his uniquely able direction in the Museum of Comparative Zoology. He had just moved his specimens, gathered during his residence in Cambridge and on his famous trip to Lake Superior, from a small square wooden building where he had first stored them into the new wing of his Museum. I found him in the basement amid a great array of bottles of alcoholic specimens and the first words I heard him speak, when asking for "the Professor", was his reply, "Dis is me", an illustration of his occasional use of a French idiom, with which we, his special students, soon became familiar. He said to me gather what specimens you can on the shores near your home, and when you return with them, I will assign you a lesson and in six weeks you will either become utterly weary of the task, or else you will be so completely fascinated with it as to wish to devote your whole life to the pursuit of our science.

I made a small collection of starfishes and seaurchins and for my first lesson the Professor handed me one of the latter as the sole object of my study.

I was more than surprised that I was expected to learn about this specimen from my own observation and not merely to commit to memory and repeat what some one else had already recorded about it in a book. This was his wise method with every new pupil in order to lead the student to realize, that in full and accurate observation was laid the foundation of all scientific research. The result of this trial was that he permitted me to become one of his five or six special students and gave me work to do for the Museum, so that I could earn my way through his course of study, which usually extended over four years. My enjoyable labor in his institution was to help take care of the Radiates and Molluscs.

As Agassiz had already attained a world-wide reputation for his Fossil Fishes and studies of the Glaciers before he came to our shores, and as Harvard was the oldest and most liberally endowed college in our land, the Professor enjoyed a unique position as the leader in natural science in America, and his private study was therefore, appropriately the Mecca not only for the zoologists of our own country and for visitors from abroad but for prominent thinkers and teachers in all departments of culture. All of these remarkable men, it was the privilege of his special students not only to meet, but to be greeted in a most informal and cordial manner.

Among those whom he especially welcomed and those whom we were particularly delighted to see, was Professor Henry W. Longfellow. Each of these two distinguished men had the greatest admiration for the genius and character of the other, and this is well exemplified in Longfellow's poem to Agassiz on his fiftieth birthday.

Around Professor Longfellow there always seemed to be a halo of exalted purity and abounding love for all mankind. On one of those

happy days of precious memory while my companions and I were students with Agassiz, our sympathetic teacher came to the Museum in the deepest distress and informed us of the sad calamity of the death of the poet's wife in the most tragic manner, and that the Professor in his heroic effort to save his wife had been so severely burned that he, himself, was in serious danger of his own life. We all felt as if a great personal sorrow had fallen upon each of us. Long afterwards when I returned to Boston from my three years wanderings in Eastern Asia and over Siberia, and again I met Professor Longfellow I had the gratification to tell him that in the interior of Sumatra where none but Malays and their Dutch rulers were to be found, I discovered in the residence of an official one single book in my native language and it was no other than an English edition of his poems, and that the lady of the house had learned at school in Holland and could still repeat his Psalm of Life.

In reply, he did not speak a word but an expression of pleasure radiated from his face and a poetic fire shone from his eyes which still reappear in the saintlike portrait that rises before me whenever I think of Professor Longfellow.

Professor Agassiz was as wise an instructor as he was an able and successful investigator. He permitted each student to enjoy the delight of discovering for himself unexpected relations between the specimens before him and allied forms, and of becoming able to assign correct values to their differences and similarities.

His own greatest contribution to the science of zoology was his masterly and classical "Essay on Classification."

One of the greatest privileges of studying with Agassiz was to live in the delightful atmosphere of enthusiasm which always made his

presence inspiring. This was particularly manifested when we unpacked and placed before him shipments of new specimens, especially those gathered by one of the Museum's most experienced and skilful collectors in the warm waters of the South Pacific seas. When he was shown a part of a fish or other marine animal, which he had never seen before at once he would tell us the family and sometimes the genus to which it belonged, and his statements were always verified when the whole specimen was uncovered.

He loved to investigate the works of the Creator, and his lectures were always largely attended, because all thoughtful men admire a lover of Nature and enjoy listening to a great master in science, who can reveal to them her hidden secrets, the results of his researches, and one who also was ever happy to be helpful to his fellow men. He regarded Darwinism as the arch heresy of his time and opposed its acceptance with all his powerful eloquence. At the close of such an address I once heard him say to his auditors "I do not ask you to accept my views, I only ask you to think for yourselves," and a distinguished naturalist who was present immediately turned to me and said, "I have made a long journey to hear Professor Agassis lecture and the remarkable words of that closing sentence proves to me that he is fully worthy of his great reputation."

To celebrate the opening of the first wing of his new Museum on Divinity Avenue, Agassiz gave a dinner, at his residence, to those students who had been assisting him in the old wooden building, which had been moved down near the Museum and transformed into Zoological Hall, with living rooms for students. I and the other new men were also privileged to be present, and as the occasion was naturally one when the past was revived, the Professor entertained us

by relating his experience in America, and he described with great zeat his famous ride in the White Mountains, where he and his two companions constantly stopped the coach in order to examine the rocks and trees and to chase butterflies. Professor (afterwards President) Felton, who was a brother-in-law of Agassiz was a member of the party, but instead of following the example of the others remained in his seat and with the dignity becoming a Harvard Professor, quietly gave himself up to the delights of reading from a pocket edition of a standard Greek Author printed in that classic language. The driver, whose main purpose in life was to make his trips on schedule time, finally lost his patience and asked Professor Felton if those men had not escaped from some lunatic asylum, and he seemed fully confirmed in this conclusion, when he was informed that they were "naturalists", for he added in an exultant tone "I knew they were naturals."

Nearly half a century, exactly forty-eight years, has passed away since I began my studies in Cambridge and now I find myself outlining these personal recollections as I sit in a cottage in the settlement of Nonquitt on the west side of Buzzard's Bay; and looking seaward my horizon is formed by the Elizabeth Islands, which Captain Gosnold discovered and named for his virgin queen, three hundred years ago. Lying inside of this range and in the quiet waters of this beautiful by, is the island of Penikese, which Mr. John Anderson gave, with a generous sum to Professor Agassiz for his famous summer school. It has been related to me by a competent authority that when the summer term of 1873 had closed and the teachers and pupils began to steam away toward the mainland, Agassiz came aft alone, and taking off his hat, bowed to his island home and said "Good bye, dear old Penikese, good bye," and then it seemed to the

few who saw him, that the Professor had a premonition that his labors would soon be over and that he would never return.

He died that same autumn, but the directions which he wrote on the blackboard for the guidance of his classes, were appropriately regarded by the new purchaser of the property as specially sacred, and I am assured by my neighbors who frequently visited the island that this precious motto of the great educator remained unharmed in his own peculiar handwriting for years afterward. The one of these rules which he most frequently repeated to his pupils was his favorite maxim written on these walls, which was "Study nature, not books," advice that is indeed worthy of being embellished by our most skilful artist and placed in a prominent position in every kindergarten and wherever the delightful subject of Nature Study is taught, throughout our land, for these are the parting words of our great teacher and his precious legacy of advice for the guidance of our youth of all coming generations.

Agassiz spoke to us, in his Cambridge lectures, so frequently and so affectionately of two of his early associates and friends in Europe that we came to feel as if we had seen them ourselves.

One of these was the great Cuvier, whose work upon the abundant fossil life of the Paris Basin made him the founder of the science of paleontology. The other was Alexander von Humboldt, probably the most learned man of modern times, for his knowledge was so exact and so universal that he was the acknowledged leader in nearly every department of natural science. The personal reminiscences he gave of these great men were both most instructive and entertaining.

As members of the Lawrence Scientific School, Agassiz's students enjoyed free access to all the lectures given in the college and we

were always present at the able instruction which was given by Dr. Jeffries Wymour on comparative anatomy and upon botany by Dr. Asa Gray, the greatest scientist in his department that America has ever produced. Each of these learned teachers would with endless patience, answer the questions of every beginner who desired further instruction upon any topic. Such a seeker for truth needed only to wait until after the formal lecture was over and then be rewarded by receiving the Professor's exclusive attention.

We also attended the courses given by other professors, of which probably the most brilliant was by James Russell Lowell, who presented the most thoughtful audiences which Cambridge and Boston could furnish a keen analysis of the writings of some one of the prominent historians, novellists and poets from the age of Chaucer to those of the present century.

Truly our experiences, as college students of the past generation, has verified the proverb that "there were giants in those days". For if we ask upon whom have fallen the mantles of those great men in science, Professor Agassiz and Professor Asa Gray, and who are the successors in poetry and literature of Professor Longfellow and Professor Lowell, we shall seek in vain for their equals through the faculties of all the colleges and universities of our whole land. Our nation meantime has increased in wealth beyond all parallels in human history, and in the use of that wealth we have exceeded all countries in generous gifts to promote free public education, but the question still occurs to us, were not the former days, the period of our truest greatness.

These years of which I write, 1860 to 1864, were included in the lyceum period of our American culture, when our ablest thinkers

willingly accepted invitations to lecture and present orally and personally their instruction to our citizens; and such courses were established not only in the cities and larger villages but in the New England states they extended even into hamlets. Cambridge possessed a peculiar attraction for the most gifted speakers, and we frequently heard Edward Everett, Oliver Wendell Holmes, George William Curtis and Bayard Taylor. Ralph Waldo Emerson was another distinguished lecturer. He always fumbled over his disjointed manuscript, but still he held his audiences spell-bound by the power and originality of his thought. It was the training by such wise instructors that has made New England with its small population a mighty power throughout this great nation.

Harvard University has always had a magnetic attraction for visitors from London, the home of John Harvard, and also for all who have studied in the English University town, whence our city derived its honored name.

The most distinguished of such guests formed the royal party of the Prince of Wales, now King Edward VII, who visited America under the direction of the Duke of Newcastle in 1861.

One of the days of his visit to Boston was devoted to Cambridge. When they came to our Museum Agassiz met them at the entrance and taking the arm of the Prince led the way through our halls. Next in order came the Duke and with him a tall gentleman having a peculiarly graceful manner and refined air. He proved to be the famous Doctor Ackland of Oxford University, the man selected by the late Queen on account of his remarkable culture from the whole British Empire, to be the tutor and personal advisor of the future King. Our Professor's plan for receiving companies of visitors was to place each of his students in the room where were displayed the specimens

under his care, and in this way each of us was afforded an opportunity of meeting our distinguished guests and of answering any question they might ask regarding the collections on exhibition.

After the royal party had left the building, I remained alone in the unbroken silence to gain an hour's more study in the fading twilight, when looking down Divinity Avenue, arched over by its magnificent elms, I saw this same remarkable man approaching unattended. I knew he was coming to the museum for Agassiz had often told us of Doctor Ackland and of the great museum of natural history he had just created in Oxford. He wished to go through our institution again and take time to note its treasures. He enquired for the Professor, and I replied that he had gone to his home, but that I would be more than gratified to conduct him through our halls and answer any questtions within my limited knowledge.

As we were walking quietly along together, after some preliminary conversation, I ventured to say to him, "Doctor Ackland, may I be permitted to ask you a question?" He promptly and cordially replied, "Certainly my young friend, what is your question?" "Does it seem strange to you, Sir, that Agassiz, our great teacher, should have located his museum of natural history for future America out here in Cambridge, while in Europe the institutions of this character are placed in the political and monetary capitals of the several empires, as London, Paris, Berlin, Vienna and elsewhere, except your own museum in Oxford, which Agassiz always describes to us as the model one of them all". "Yes," he answered, "it does seem strange, but what has suggested such a question to your mind." I said "Nearly all of the prominent men who visit our country come here to Cambridge and call on Professor Agassiz, and I have noticed that several of these gentlemen of broad and unbiased views, have given partial

expression to such a suggestion, for they have seemed to think that to reach our museum they had travelled nearly as far from New York, where the most of them had landed, as they had to come over the sea at all." I also remarked, in substance, that as science does not appear to create wealth directly, but only to use for the higher and nobler purpose of promoting original research, it seemed to me natural that an institution, which must depend upon the interest which rich and generous men may take in it for its existence and prosperity, should be located in the immediate vicinity of their homes. Now New York is our city of the greatest wealth and therefore probably the best location for the future museum of natural history for our whole land."

In reply to this lengthy explanation of my views, he simply turned toward me and looking me straight in the eye, said "My young friend, that is a grand thought."

This hearty endorsement by such an eminent authority of the desirability and feasibility of my youthful vision, so completely captivated my imagination that I at once determined that I would work for nothing else by day and dream of nothing else by night until I had, at least in some degree, aided in establishing a museum of natural history upon Manhattan Island. And subsequently, when I journeyed for three years in Eastern Asia and over Siberia, I carried with me everywhere two things, a Bible and a sketch of a plan for a museum in New York, hoping to have the opportunity, which I ultimately enjoyed of showing this outline drawing to Sir Richard Owen, then superintendent of the natural history department of the British Museum in London, and of obtaining from him an approval of my general plan, which with his corrections and suggestions would have a scientific and

practical value that would at once be recognized everywhere, and armed with such an important document, I hoped that on my return to my native land I might be able to reach and interest in such an enterprise many of the generous men of our chief commercial metropolis.

Soon after I became absorbed in the contemplation of this dream I took the liberty to call on Professor Asa Gray and ask if I might disclose to him my hopeful anticipation. He listened most kindly to my fanciful scheme and then said in substance. Your purpose is admirable, but the difficulties to be overcome will be great, for a number of opportunities to promote science have been brought to the attention of the wealthy men in New York and yet they have never become sufficiently interested in such matters as to be induced to subscribe any considerable sum of money--- However, make an earnest effort to carry out your purpose, and if you do not succeed, do not be disheartened but take up some other good work and devote yourself to it with all the energetic enthusiasm of your nature.

Fifteen years afterward, when the first section of our building was nearly completed, I learned that Sir Joseph Hooker, Director of Her Majesty's Garden at Kew, and Doctor Gray were journeying together in California and the Rocky Mountains, and I wrote Doctor Gray expressing the hope that they would return via New York and favor our new museum with a visit. They accepted the invitation and as we were walking together though our main hall I said to Doctor Gray, "Do you remember that while I was a student in Cambridge I once ventured to tell you of my youthful hopes," and he promptly replied, "I do, indeed, remember the occasion and our conversation very well. At that time it did not seem to me possible that such an enterprise as this could be carried forward to a successful issue, but now I most heartily congratulate you and all who have taken part in laying so wisely

and securely the foundations of this grand institution." Subsequently, he proved his friendship by urging the few surviving members of the New York Lyceum of Natural History to offer to deposit their library and their small herbarium within the walls of our fire-proof edifice upon whatever terms our Board of Trustees might suggest. He took this interest in the Lyceum because the late Doctor Torrey, his personal friend and able associate in botanical studies had been one of the prominent members of that society for many years, and also because he was fully convinced that our Museum was destined not only to survive for many generations but also that it would have a steady growth in its power to aid in the advancement of science throughout our land.

A devoted friend of Agassiz, who frequently came to the museum in Cambridge in those days, was Professor Jules Marcou. He was then preparing, with great skill, a geological map showing the principal formations of all the continents, so far as was known up to that time. This world-wide labor brought him into correspondence with the original investigators of all lands, and the copies of their important papers, thus gathered, formed his unique library.

I confided my plan to him, early in its inception and he cordially approved of my purpose and encouraged my hopes for its future fulfilment. His early interest in the creation of a museum in New York grew stronger as our institution developed and finally in accordance with the generous provisions of his will, his library was forwarded to us from Cambridge, and formed his noted contribution to science in our metropolis. In his detailed history of the life of our great teacher on page , of volume , I find he has honored me with a full account of the part I took in the events of those times.

The Civil War.

After the spring of 1861, the all-absorbing thought in Harvard College was concerning the sudden outbreak of what we then called the Great Rebellion, but what we now more appropriately name the Civil War. Massachusetts was one of the most patriotic states of the old Union, and promptly responded to President Lincoln's call for troops to defend the national capital. With almost breathless anxiety we were waiting to hear the result of the first advance of our army when the news was received of our great disaster in the battle of Bull Run. Indeed, many of us never heard the name of that disorderly retreat mentioned, without a shudder, during all the four years of the war.

As an illustration of the tense state of the public mind, almost bordering on panic, which prevailed for a short time after in our midst, I may state that Professor Agassis, himself came to the Museum one day, evidently seriously alarmed and said that a rumor was current in Boston that some rebel sympathizers were even plotting to seize upon our little arsenal in Cambridge and ship the arms it contained to some southern port, and I went up to the enclosed grounds which were near the historic elm, under which General Washington assumed command of the American Army, on July 3, 1776, and there I saw President Felton assisting in placing a temporary guard of students, from the upper classes of the college, over the buildings which we regarded as especially confided to our care. No disturbance of any kind occurred, but there was a reasonable ground for fear of trouble, for threats of lynching Wendell Philips, for his inflamatory speeches, filled the air. Indeed we could not but recall the thrilling scenes in the War of the Revolution, which were enacted in that same historic region, where Paul Revere made his famous midnight ride and the

shot that was fired for freedom in the neighboring town of Lexington was "heard around the world."

In the following year, when the special call came from President Lincoln for "nine months men", it then became no longer possible to defer the duty to volunteer for the support of our National Government. The spirit of 1776 was renewed in 1862, and the hearty response which came up to Washington from all parts of the northern states was well voiced by the popular song that at that time echoed and re-echoed throughout our land:

"We are coming, we are coming,
Our country to restore;
We are coming, Father Abraham,
Three hundred thousand more."

From Harvard University some seventy five students, with others from the Battalion of the NewEngland Guards of Boston, which was composed for the most part of the sons of wealthy merchants and had already furnished many officers for the Second, Sixteenth, Twentieth and Twenty-fourth Regiments from our State, joined to form the Forty-fourth Regiment of Massachusetts Volunteers, under Col. Francis L. Lee, who was also a graduate of our College. The history of our service has been well written by several comrades and ably edited by Mr. J. B. Gardner of Company D, and therefore I only record here my own individual experience.

Expedition to Tarboro.

We were sent to Newbern in North Carolina where we arrived on the twenty-sixth of October 1862, and four days later began our first expedition under Major General John G. Foster. From Newbern we were transported by water to "Little Washington" on the Tar River. Thence

we marched northward to Williamston on the Roanoke River, and to Hamilton on the same stream, and finally we advanced westward nearly to Tarboro. Our force consisted of about five thousand men and twenty-one pieces of artillery, and the object of this long incursion into the enemy's country was to scatter a body of confederates, who were gathering on the Roanoke near Plymouth and were threatening to retake that town, then held by our United States troops. The prosperous towns through which we marched, located in the more fertile part of North Carolina, were generally laid out with marked regularity. Ample grounds surrounded many of the larger dwellings and an avenue of fine shade trees often led up to the main entrance, and we were constantly reminded of the larger villages in our own New England States, the whole effect being one of peace and prosperity and entirely out of keeping with the desolation and destruction of war that was rapidly approaching them. The roads, which we followed between these towns were frequently bordered with great cotton fields, there the abundant crop, which no one had attempted to gather, was bursting forth from the ripened bolls in rich profusion and covering the ground with its white silky fibres.

Our first skirmish occurred on a Sunday afternoon, just before sunset. The first of our men that was struck down by a bullet from the enemy, belonged to the regiment before us. The fact that he shouted loudly for help, we soon learned was an assurance that he was not fatally wounded, for there is rarely any outcry made by the man who has received a serious injury and he only asks to be lifted gently onto the stretcher, or begs to be left alone where he fell.

As the enemy withdrew we advanced until we waded through a deep cold stream, an experience that was constantly repeated on all our

long marches. The sand that was washed into our shoes soon made us very footsore, but we were young and hopeful and always anticipated a victory and so kept cheerfully limping on.

At midnight the battery of our brigade went into action and scattered shells around a bridge at the foot of a hill and into a pine forest, which surrounded our position. This, our first experience of an engagement, was brilliantly spectacular, and therefore one we long remembered. Our regiment of infantry filed out from the road and formed into line in a corn field behind the battery, and at the earnest request of the artillery-men, who were also new recruits, held ourselves ready to repel any sudden rush the confederates might make us drive off our gunners and seize their field-pieces. We were usually permitted to gather the dry rails from all the neighboring fences and make a series of bon-fires that took off some of the keen chill of the night air, but as we were, at that moment in contact with the enemy, we could not have the comfort of fires, which would clearly reveal our exact position and our moderate numbers.

Our line of march as indicated above was kept as near as possible to the banks of the numerous rivers, in order that we might have as long as possible, the important support of our gunboats.

On the fourth day of our wearisome march we made our noonday halt in an open cornfield, where the road forked, one branch leading straight on for Tarboro, while the other made a long curve around and passed through many swamps. As we were still resting, an order suddenly came for Companies A and C, 44 Massachusetts, to fall in and advance. Part of a company of cavalry joined us and their Major and the Captain of our Company A, commanded this little detachment of less than two hundred and fifty men. We continued along the main

road, which led us through a forest of large pine trees, and soon we came upon a pair of the enemy's videttes at every turn of our winding way. At the first sight of our two little howitzers, they scampered away and we rapidly advanced, and so we skirmished on until nearly sunset, when it became evident that we were close upon a large body of the confederate army, for they killed one of our two cavalrymen who was leading a few yards in advance of us.

Our company of infantry was now brought to the front and we deployed into an open field, but the moment we formed our line, the order came "All about face - forward march -- double quick"! and we were then informed by our officers that we had already marched into the midst of the gravest peril and retreat with all possible haste. Whenever any one of our men fell down from complete exhaustion, his companions immediately divided up the burden of his gun, cartridge-belt, knapsack and heavy roll of blankets and helped him on, and when he could not possibly walk, we lashed onto our gun carriage, for we all regarded being left behind as a worse fate for a comrade than death on the field.

By midnight we were back to the place where we left the main body of our troops at noon, but they were gone, and not till that moment did we realize that our little handful of men had been facing the whole body of the enemy entirely unsupported. Indeed the only way we could learn how to follow our corps was by sending out cavalry-men on the different roads and they traced the deep ruts made by our artillery. And so we kept on marching all night except for a short halt, and while the most of our command tried to sleep in a driving rain, others of us who volunteered for this service, were posted in groups of threes along the zigzag Virginia rail fences by the road-sides, with positive orders to keep a close watch down the road and

not wait to challenge but to take deliberate aim and fire at the first moving object we could discern through the storm. We had not been waiting long before I espied a human form crouching and crawling in a gully beside the road. I waited until he approached near enough for me to cover him with certainty with my rifle, and then I thought it is my duty before taking a human life, to call out that he was entirely at my mercy and any attempt on his part to rise up suddenly and fire upon me and my companions, meant for him instant death. When in reply to my challenge came out of the darkness the piteous cry, "Oh, Massa Don't shoot - Don't shoot, Massa" - and I found that my dreaded foe was only a defenceless and terror-stricken negro. He did as I directed, and crawled up straight to the muzzle of my gun and laid down at my feet. I asked him how he came to leave his cabin and go wandering off alone by night when there were soldiers everywhere with loaded muskets. He said he belonged to a widow-lady who owned a plantation "just over yonder", and that she took all the horses and fled as soon as she heard the Yankees were coming, and now in the darkness he was trying to go over to a neighboring plantation where he knew the colored folks and where he hoped he would be farther away from the big guns. He repeated that his mistress had deserted him and though he was probably 40 years old, he piteously begged me to let him be my "boy" and that I would take him to Newbern where many of those who had worked with him in the cotton fields, were already enjoying their freedom. I told him that I would take him to our Captain, and with that officer's and the Colonel's approval, he might march as near me as he could and I would be glad to share my rations with him until we arrived back to our camp.

Soon after the pickets were called in, and my new servant fol-

lowed my footsteps. At the dawn of day as we were joining our main corps and we were expecting to take a needed rest, a general commotion was manifested throughout the camp. An order had been suddenly issued for all our men to fall in and begin a hurried retreat, not only with the double number of eight men abreast but with as many more as could march side by side in the narrow roads; for the statement had come from our scouts that during the past night the enemy had been heavily re-inforced from Richmond, and hence it only remained for us to reach Hamilton by forced marches on the banks of the nearest stream where our gunboats could also take an active part with us in any engagement against superior numbers.

During the same night other negroes had stolen into our camp, as a place of long-sought refuge, and now they crowded and jostled along with childish glee, and never once stopped to cast even a parting look at the plantations where they were born. Their only thought was that they were going to be free. As we hurried by within a mile of the open field from which our two companies began to retreat at sunset the day before, we heard a constant booming of heavy cannon fired over that very spot, evidently for the purpose of trying to make our main body of troops believe that we were still near there and suffering for re-inforcements and thus draw our whole corps into a helpless ambuscade. But we had entirely escaped out of their power and were all marching merrily to a place of safety.

Our purpose in making such a daring attempt to reach the inland town of Tarboro, was in order to destroy an iron-clad ram, which it was reported the Confederates were then constructing at that town.

As the enemy had been heavily re-inforced by veteran troops from their army in Virginia, it was deemed wisest by our officers that we

should continue marching down the banks of the Roanoke River to its mouth at Plymouth and to return from there to Newbern on transports over the Albermarle and Pamlico Sounds. After marching almost continuously for eight days and bivouacing nearly every night on the bare earth and in the open air, we were thankful, indeed, to be taken on board the steamers, which landed us safely on the banks of the Neuse near our camp, fifteen days after we had set out on this expedition.

Having arrived safely back again under the "Stars and Stripes", I said to my "boy", who had faithfully followed close to me every day, "You can now report to the officer in charge of the encampment for contrabands, who will give you food and clothing and soon find work for you to do, that you may earn your own living. Henceforth you own yourself and for the rest of your life, you are a free man."

Some time afterward when I had returned from Beaufort and was stepping off the cars at Newbern, a colored man came rushing forward and seizing my hand shouted out in tones of the deepest gratitude the only part of my name he could remember, "Mr. Morel Mr. Morel" It was the negro that I had been privileged to aid in escaping from a life of slavery.

Expedition to Goldsboro.

The large addition to our army of nine-months men again aroused in the northern press that old familiar way cry, "On to Richmond".

Our army of the Potomac, then under General Burnside, was in a fortified camp on the northern or left bank of the Rappahannock opposite Fredericksburg. The Confederate army, under General Lee, occupied the hills behind that town. It was decided that the Union forces should attempt to cross the Rappahannock on pontoon bridges and storm the heights and to break the enemy's line at its centre. The confederates were heavily entrenched and well privided with heavy

guns, and the space between the town and their line was filled with rifle pits.

For an unprotected force to build bridges over the river in the face of a constant fire from sharpshooters, to take the town, pass the rifle pits and successfully storm the entrenchment on the heights was of course impossible, and our men were mowed down by the thousand and obliged to retreat in a disastrous defeat.

This occurred on the 13th of December 1862. Two days before that date our whole army corps, under General Foster, began an advance to Goldsboro, where there is an important bridge over the Neuse river for the railroad that connects Richmond with Wilmington and Charleston, and the purpose of our expedition was to destroy that bridge and thus, in case General Burnside was successful, to prevent General Lee from being promptly reinforced from the southern army under Beauregard.

Our route was the country road along the south or right bank of the river. We first encountered the enemy, in sufficient strength to attempt to stop our advance by offering us battle, as we came near to Kinston, the first large town on our march. Where the main road led through a swamp they had placed effective obstacles and constructed strong breastworks.

When General Foster learned that these defences had already been made by the enemy, he directed a small force to keep up the appearance of our continued advance, while he adroitly directed our main body to take a long circuitous route and approach the bridge over the Neuse near Kingston from the south instead of going by the direct road from Newbern along the southern bank of the river.

When all our regiments were drawn up for battle, our place was in the third line, and when the order came for us to advance, we

followed immediately after the Forth-fifth Massachusetts down into a swamp filled with a forest and thicket of tangled vines, where the two lines before us had suffered badly and we marched over many fallen bodies of our own troops. Just then a loud cheer from the front line announced that the engagement was over and the enemy was in full retreat. Indeed we pressed so closely upon their rear guard that the confederate who was stationed under the bridge with barrels of pitch and turpentine to set it on fire, the moment their last files had passed over, was shot before he could carry out his purpose and as he fell with the burning torch in his hands he set himself on fire and was burned to death by his own preparations around him. This important bridge was therefore unharmed and we crossed the river and captured the large town of Kinston. As our regiments came within its borders and lighted up their camp fires one of their bands which had brought its instruments struck up a set of lively tunes and many men throughout the camp joined in the chorus of the popular songs and shouted for victory, and for a time we almost forgot the sad scenes of death through which we had just been passing.

The next morning we returned to the south side of the river, and as our regiment had come upon the battlefield too late to take an active part in the engagement at Kinston, we were now placed in advance of the whole force. The retreating enemy had prepared an entrenchment in a thick wood, when our road crossed the river at the hamlet of Whitehall where they were building a gunboat. Our route led us over a hill, and as we came within range of their masked batteries their cannon opened on us with solid shot and one struck the ranks of my company, just before me, and instantly killed two of our comrades, and we carefully stepped over their lifeless bodies as we advanced.

We then turned towards the river and finally formed in a line behind a zigzag rail-fence along the bank of the narrow stream. We now found ourselves in an open field and therefore wholly exposed to a deadly rifle fire from a breast-work in the thick forest on the other bank. As we obeyed the order to lie down, we were so close together, that it was difficult for us to handle our old-fashioned, muzzle-loading Enfield muskets, but before the two hours had passed that we were continuously under fire, my company had lost so many men in killed and wounded that we could toss our guns about in any direction without being in each others way. As our men were struck by the enemy's bullets, their names were repeated to our Captain, who was exactly behind me and in this way I knew how fast we were losing our comrades. For a moment during the rapid firing I leaned my head forward and rested it upon one of the rails before me and at that instant a bullet from a sharpshooter struck the rail, which was so thick and dry and hard that it stopped the bullet which, if it had kept on its course would have passed through my head from ear to ear. A moment later and another bullet struck the under side of a rail within a few inches of my face. It split the rail and knocked a piece of its bark into my mouth, and I spit it out onto the ground and kept on loading. I fully realized that unless we should be at once relieved it was almost certain that I would be shot the next moment, but I calmly considered the whole situation and the conviction that I had only come into this great danger from a sense of duty to my country, made me resigned. The sharpshooter who had selected out our captain, on account of his uniform continued his skilful shots for us both and indeed it seemed that nearly twenty bullets must have passed within the space of a foot from one of my shoulders, over my head to the other shoulder, and yet after having been under fire continuously

for two hours, we both came out of this perilous position without even the slightest wound.

When the officers commanding our brigade learned of the losses of my company, they ordered our regiment to fall back and they brought up a field battery that soon cleared out the sharpshooters from their vantage ground in the thick forest on the opposite bank.

We then resumed our march into the interior of the country and by night were near the Goldsboro bridge and the next day our regiment was placed in the rear. Our road led through open fields and thick woodlands of grand pine trees and when the cannon in front began to roar, we witnessed what we all agreed was the most pitifully painful sight we had ever seen. A corporal and three or four soldiers from the leading regiment with fixed bayonets were mercilessly prodding on a tall, fine-looking private, who was trying to desert and escape to the rear. His cries from fear and groans from the heartless steel were so sickening that we hurried by as fast as possible.

When we came out of the thick wood, we found ourselves at the top of a wide, open field that slowly descended to lowlands a mile away. Ourwhole army was drawn up in a series of parallel lines with its regiments of infantry and batteries of artillery and a column of cavalry on either flank. The front line was in full action and from time to time there would be a light lull, but this was immediately followed by a prolonged cheer from our men as the enemy withdrew and we gained an advanced position in the field. Such a comprehensive view of a battle rarely falls to the lot of aprivate soldier, and we all regarded the picture as most imposing. Then to add to our enthusiasm there arose before us a thick cloud of very black smoke

high into the sky as if from the burning of dry pitch pine timber, and we all knew that the Goldsboro bridge, which we had come so far to destroy, was in flames. Then the General commanding our brigade turned to us and said "Boys our mission is accomplished, we will go home."

With a cheer that the surrounding woodland echoed widely we promptly led off on the march to Newbern, but we had proceeded on our homeward journey only a mile or two, when a heavy cannonading suddenly burst forth in our rear. Then came the order to halt and immediately after a request that we hurry back to the battle-field. The enemy finding we were withdrawing, were making a fierce assault upon our two last regiments and their accompanying battery which awaited their near approach and then opened such a destructive fire that the confederate line was decimated and obliged to beat a precipitate retreat; and this was the last engagement on our expedition to Goldsboro. We again turned our faces homeward and bivouacked on the open cornfield where we had passed the night before.

The forests through which our route led, were composed of very grand and tall trees of the long-leaf pine. Their trunks had been scored with the axe and were overflowing with an abundance of resin, which had not been gathered since the men of all this region joined the confederate army two years before. Our soldiers set these trees on fire on either side of our roadway and we were literally marching between columns of bright flames. When the fire mounted high it found many knots in the upper branches covered with pitch and when they blazed forth they gave each tree the appearance of a huge candelabra, kindly let down from the sky to light us on our dark pathway.

The nights during this December march, while we were trying to

sleep on the bare, unsheltered earth were so cold that the straps of my knapsack still bear heavily on my shoulders, whenever the damp east wind now blows, although forty-six years have glided by since we safely arrived back to Newbern.

Soon after our return, we were all saddened at the news from Washington, that our great army under General Burnside had been entirely defeated at Fredericksburg with a loss, since ascertained to be of killed, wounded and missing, twelve thousand six hundred men, while the confederate loss was only five thousand three hundred.

The entire loss on our expedition was only five hundred and ninety-one and the news of our complete success was especially gratifying to all our northern friends as it was received and published soon after that of the great disaster on the Rappahannock.

The memory of our victorious march to a place so far within what were then the boundaries of the Confederacy continued to be distinctly cherished for a long time afterward, notwithstanding the fact that many battles of the Civil War followed at short intervals and that every approaching engagement caused all patriotic citizens the most intense solicitude. And now as I write this page, General Howard is publishing his reminiscences of Sherman's march through Georgia, and he gratefully records that in November 1864, when he asked General Sherman what was to be their route from Atlanta, Sherman replied, "I shall try to go from here to Savannah, striking the sea and connecting with our supply ships in that neighborhood or perhaps farther south; but I hope to reach before long that important point", and Howard adds that as Sherman spoke he pointed on the map to Goldsboro in North Carolina.

As it would be a task of some months to reorganize the army of

the Potomac, and there was no prospect that meanwile our corps in North Carolina would be called upon for active service, I ventured to go to Colonel Lee and fully acquaint him with my student life in Cambridge under Professor Agassis. Just before that time the Medical Department at Washington had issued a request that a meteorological record should be kept at as many hospitals as possible, and I suggested that, probably, I could make some observations of value if I should be detailed for that special service to a hospital near Cape Lookout. My Colonel and the Medical Director of our Department heartily approved of this plan, and I soon found myself fully equipped with all the necessary instruments and most pleasantly established in a comfortable dwelling, which had a gallery looking southward toward Fort Macon over the beautiful bay Beaufort. A large summer hotel near by, which stood on piles in the shallow borders of the bay, had been changed into a hospital for the invalid soldiers of our northern army, and I was nominally attached to its corps, but really given full freedom to roam wherever I pleased within the area under our military control.

I informed Professor Agassis of the good fortune that had come to me, a private soldier, and he at once wrote me a long letter, with his own hand, describing what specimens I might hope to find in a locality so favorably situated for zoological study. He also forwarded me all the apparatus necessary for gathering and preserving specimens for the museum in Cambridge from the rich fauna of the adjoining ocean shore and from the long narrow channel that stretches southward from the broad waters of Albemarle and Pamlico Sounds. These two great bodies of salt water, which are so extensive as to form a feature of our whole eastern coast, are only old, drowned river-valleys

like the Delaware and Chesapeake Bays. All these invasions of the sea have been made possible by the sinking of the Atlantic border or our continent and this downward movement still appears to exist and be making slow progress even at the present day. Such oscillations of the earth's crust seem to have been occurring at longer or shorter intervals in this region during its later geological history, for Professor Shaler has found evidences that, since the close of the last glacial epoch, three periods of successive elevation and subsidence have occurred, each of them through an altitude of more than fifty feet, and he has also discovered that where Albemarle Sound traverses the Dismal Swamp, its channels have, at low tide, only four or five feet of depth, but the waterways of that region, where they receive little or no detrital matter, even in times of heavy rain, occasionally retain a depth of twenty or thirty feet, their bottoms lying even beneath that of the neighboring parts of the open sea.

The whole State of North Carolina is divided into three areas of very distinct physical features. (B.E. vol. 17, p.599) The western section is a rugged mountainous plateau between the Smoky Mountains and the Blue Ridge. The middle region is a country of hills, valleys and rolling uplands, with broad-backed swells having south-eastward trends and forming the watersheds between the principal rivers, which take their rise on the Piedmont plateau, or on the eastern flanks of the Blue Ridge, and flow to the ocean through wide valleys from 300 to 500 feet below the intervening divides. Eastward to the sea extends a level country, which is a part of the "Coastal Plain" that forms the Atlantic border of the continent and contues around the Gulf of Mexico beyond the western boundary of Texas.

The sands, clays and other detritus, which compose this "Plain"

and have largely filled up its broad sounds are the results of the abrasion by ice upon the mountain and hilly parts of the state during the several glacial epochs, particularly during the last period of cold. At the melting of the great accumulations of ice and snow these materials were swept down onto the lowlands, and small quantities are constantly transported seaward by the existing streams.

The fartherest points inland which we reached in our marches, namely, Hamilton on the Roanoke, the vicinity of Tarboro on the Tar River, and Goldsboro on the Neuse, are all situated in this level area. The shores of Albamarle and Pamlico Sounds are so low that it is said that the whole surface for fifty miles inland from Cape Hatteras does not (B.E.vol.17, P.589) rise more than twenty feet above the sea-level, and all that we saw on our voyages from Newbern to Washington and Plymouth confirms that statement.

On these voyages we passed Roanoke Island, between Albemarle and Pamlico Sounds three times and therefore became familiar with that historic locality, where the first effort was made to plant an English Colony in the NewWorld. As early as 1584 Sir Walter Raleigh sent over an expedition, which returned with such enthusiastic accounts of this region that Queen Elisabeth gave it the name of Virginia, because it had been made known to the world during the reign of England's Virgin Queen. The next year Raleigh sent over seven vessels and on them one hundred and eight colonists, who chose this island for their future home, but it had no suitable harbor and other disadvantages were found to be so serious that the settlement was abandoned in 1587.

Twenty years later another expedition was sent out from England with orders to search for a suitable harbor near the mouth of the James River and hence the founding of Jamestown, of which important

event our nation celebrated last summer the three hundredth anniversary. And now a new era in history promises to come soon to this neglected land, when these sounds and their extensive ramifications shall be madepart of a great sheltered waterway that will border the coast from Plymouth in Massachusetts to Beaufort in this State of North Carolina.

A long narrow strip of sand, pierced by a few inlets, forms the ocean shore of nearly the whole state, and juts out into the open Atlantic at three points, Cape Fear, Cape Lookout and Cape Hatteras with its dangerous shoals. It will be an engineering achievement, worthy of the liberal support of our national government to erect and successfully maintain a lighthouse on these shifting and treacherous sands in the deep ocean.

The part of the coast, that I most frequently visited, was between the Beaufort Inlet and Cape Lookout. The direction of the prevailing winds is from the east and the northeast and as the coast, particularly south of Lookout, curves to the westward, the surging waves strike the shore not at right angles but obliquely, and therefore cause these constantly-moving sands to make such a grand march southward that they have already reached Cape Florida. In winter these easterly storms are especially severe and they sweep the unprotected shores with great power, but it was inspiring to climb over the high dunes and try to face their violence.

The short scrubby trees, that cover these islands, are all bent over and lean inland and their branches are packed down into an almost impenetrable thicket. The scattered cabins of the few inhabitants are on the western and sheltered sides of these islands along the shores of the sounds. Besides the abundant marine life of the

sound, its waters were filled with flocks of ducks and long lines of wading birds came to follow each receding tide. They had not been hunted for the two years of the war and were strangely tame.

The inhabitants of these remarkably shaped islands form a distinct and peculiar community. They apparently took little interest in the war for they possessed no negroes, and few if any of them had joined the confederate army. They were the poorest of poor white people in any part of our land. I visited them to buy shells and to employ their children to aid me in searching the shores for marine specimens. The first house I entered stood in a small cleared space, where its owner tried to raise sweet potatoes and a few vegetables in the sterile, sandy soil. It consisted of two rooms with a large chimney at one end built up on the outside, and I could look out between the boards in every direction. They had no chair to offer me, only a rude bench with four legs. The children gathered round and brought whatever curious things from the sea they possessed. I remarked to the father you have a large family, and he replied "yes we have <u>seven</u>", whereupon his wife promptly corrected him by saying "we have <u>eight</u>", and after that he sat still in a corner, apparently cowed by his miserable failure to give me the correct answer, while his wife improved the opportunity to carry on the conversation. The eldest was a girl and I asked her age, and to my question the mother promptly replied, "she is fifteen -- just as old as me, when I was married." And for these and for all the other children of that barren island, I did not find even an apology for any kind of a school. The whole community appeared to be as ignorant of and as indifferent to all that was happening in the outside world, as the natives of the islands in the Soth Seas.

The only occasion when I ever saw these thin, pale, long-haired men exhibit any commendable degree of activity and energy was at the annual round-up of their half-wild ponies, which are left at all other times of the year to take care of themselves as best they can. A stockade about eight feet high enclosed a space some fifty feet square. At the top was a rude platform for the invited guests, for this was the grandest holidy of all the year for all the people in the surrounding country. The men and boys formed their line at one end of their narrow island and gradually drove the wild herd into the corral before us. Whenever a horse tried to escape, he was quickly brought back by these men who rode bareback very skilfully, and occasionally without even a bridle. They also separated out from the wild, struggling mass within the corral, any particular animal with the greatest certainty and ease.

Thus following the delightful occupation of a naturalist in a new locality, the time for which I was detailed passed only too quickly away. I prepared my report on the weather for the government, and packed and forwarded a large shipment of specimens to Cambridge, and was soon after ordered to rejoin my regiment and prepare forour voyage home. A month later our transport entered Boston harbor, a right royal reception was given to the "Forty-fourth" as we marched up State street and broke ranks on the historic Common, with orders to reassemble soon at Readville and be mustered out of the service of the United States by an officer of the regular army.

And now after more than forty years, our country known among all nations as the "Land of Peace and Plenty" has taken a prominent part in the World's Conference at The Hague and on account of our isolated position and our promise of unlimited future growth exerts a paramount influence for the promotion of peace throughout the world, and

of all our citizens who are specially advancing this universal blessing none are more enthusiastic than the survivors of those who wore "the blue" in our Civil War.

The East Indian Archipelago.

After having been mustered out at Readville, I hastened to my home in Maine, and soon eagerly returned to Cambridge, and resumed my studies under Professor Agassiz. In the summer of 1862, before I volunteered to go to the war, I visited Bermuda on a small smack engaged by Mr. P. T. Barnum to collect angle-fish, brilliantly-colored sea-anemones and other attractive specimens of tropical marine life for the aquarial exhibition in his Museum, which was located at that time, where the Bennett building was afterwards erected and the St. Paul's bukilding now stands, on Broadway at the corner of Ann street in New York City. Mr. Barnum had, a short time before, purchased the Aquarial Gardens in Boston, and he offered to Professor Agassiz the opportunity to send out free any assistant he might select from his corps to collect for the Museum in Cambridge. This privilege the Professor gave to me because I had been making a special study of the fauna of that portion of the Atlantic. Mr. Damon, one of Mr. Barnum's assistants was selected to have charge of this expedition which proved to be most enjoyable and very successful. My happy experience on this voyage and while collecting on the shores of the sounds of North Carolina, kept continually recurring to my memory in the quiet hours of study at my desk in the Museum.

As I was devoting myself to the investigation of mollusca, I came to learn that when Linneus, the "Father of Natural History", published his Systema Naturae, he referred to the carefully drawn

figures in the Rariteir Kamer or "Chamber of Curiosities" of Rumphius for illustrations of the families, genera and species of shells he was describing and thus he made that work a standard for all future reference. Rumpf, whose name was latinized into Rumphius as an acknowledgement of his great service to the science of natural history was of German origin and was born in Hesse-Cassel about the year 1626. Having studied medicine, at the age of twenty-eight he went to Batavia and entered the employment of the Dutch East India Company and thence proceeded to Amboina, one of the Spice Islands. At the age of forty-two, while contemplating a voyage back to his native land, he suddenly became blind and therefore never left his adopted home in the Orient. The shells which he figured with remarkable skill, he had collected himself on the shores of those distant islands, and therefore the specimens which Linnaeus made the standards of his classification were not gathered on the neighboring Atlantic coast, nor on the near-by shores of the Mediterranean but among the islands of the far eastern tropical seas.

After the death of Rumphius, his great collection was brought to the University of Leyden in Holland.

When Napoleon I, started out from France to conquer all Europe, his purpose was not only to make Paris the political capital of the continent but also to make it the centre of culture, and when he had subjugated Holland in 1811, some one was ready to suggest that this historic and unique collection was one of the scientific treasures which should be transferred to the French capital. A few years later when the "Low Country" achieved its independence these specimens were returned to Leyden, and finally after other vicissâtudes, no one of them can now be identified as the particular shell from which any given drawing was made. Rumphius, who was appropriately termed by

his contemporaries the "Indian Pliny", carefully recorded the particular headland and bay where each species and its allied forms were found, so that any naturalist, who could personally visit those remote islands could readily find the "type" specimens of Linnaeus's writings and re-collect the mollusca fauna of that part of the East Indian Archipelago.

I recited these facts to my devoted friend Colonel Lee, and he kindly introduced me to some of his personal acquaintances, who might share my enthusiastic interest in the marine life of the oriental seas, and they so generously gave me the means to carry out my plans, that on my return it became my privilege to dedicate my "Travels in the East Indian Archipelago" to "The generous friends of science in Boston and Cambridge, through whose liberality the travels herein described were made."

I sailed from Boston on a merchant ship, which was loaded with ice and apples, in January 1865, and arrived at Batavia in the following April, having been one hundred and fifteen days at sea and the only passenger on the vessel. I had been amply provided with letters of introduction from Hon. Charles Sumner, who was then chairman of our Senate committee on Foreign Relations; from the Secretary of our Navy and from the officers of important scientific societies in Holland, who took a hearty interest in my proposed journeyings in their great eastern possessions, the Netherlands India. Our American Consul, a graduate of Harvard added to these recommendations his official endorsement and forwarded all the papers to the Governor-General, who resides at Buitenzorg (i.e. Sans Souci) in the higher lands south of Batavia, where the Dutch government has created one of the first botanical gardens in all the tropical world.

While waiting for the governor's reply, I devoted myself to gathering insects, and particularly butterflies in the suburbs of the city. My friends noticing that I continued to wear such a straw hat as we use in summer in America, carefully cautioned me to provide myself with an East Indian helmet, saying that the rule in that climate was to cover the head with a protection which would protect its owner from a stream of hot water, and indeed the heavy bamboo hats of the natives would answer such a requirement. I heeded this advice, but it was already too late to escape a short attack of fever, which sent me to the hospital with the symptoms of a serious illness; but cheered by the frequent visits of our consul I soon began to recover, and it afterwards proved that this experience had rendered me so immune against similar attacks, that I never hesitated to go in search of rare specimens, into the most malarial swamps wherever I journeyed.

In due time I was honored by His Excellency with a gracious reply, enclosing a copy of the following letter, which had already been mailed to every part of the archipelago:

"To the Heads of the Provincial Governments in and out of Java---

I have the honor to ask Your Excellency to render to the bearer, Mr. Albert S. Bickmore, who may come into the district under your command in the interest of science, all the assistance in your power, without causing a charge to the public funds or a burden to the native people."

His Excellency, besides granting me this remarkable favor, also wrote our Consul that he would be happy to offer me "post-horses <u>free</u> over all Java". But it was with the hope that I would be permitted to travel and study in the Spice Islands that I had voyaged thirteen

thousand miles over the North and South Atlantic and Indian Oceans and I was only anxious to reach, as soon as possible, the goal of my long wanderings.

Having thanked the Governor-General for his courtesy, I procured a ticket to Amboina, the capital of the Spice Islands, and was about to go on board the mail-boat, when I found another document was required by law. It was an official permission to travel in the Netherlands India for one month. At the expiration of that time, this privilege was to be carefully renewed; but I preferred to regard the governor's letter as an ample passport for any period and I never troubled myself farther about the matter during the year I was journeying in the Dutch possessions.

On the 7th of June 1865, we steamed away from Batavia along the north coast of Java to the cities of Samarang and Surabaya; thence by the south coast of Madura to Macassar, the capital of Celebes; thence southward through Sapi Strait and eastward to Kupang and Dilli on Timor and northward to the Banda Islands and after three weeks and a day I arrived at Amboina.

In my volume, "Travels in the East Indian Archipelago", which was published in 1868 in New York and London, and a German translation of it at Jena, I have described these islands and the other parts of the Archipelago and have given descriptions of their varied inhabitants. Therefore, in this relation of my personal experience, I quote only a few pages from my former writings.

The arrival of the monthly mail at Amboina is the one event that breaks up the monotonous life of its remote community of officials and merchants, who have left their homes in Holland and have come to this distant Orient with the hope that in due time they would acquire

a competence and return to pass their declining days in comparative affluence at the Hague or Amsterdam or particularly at the attractive city of Arnheim.

Governor Arriens, to whom I brought letters from his personal friends in Java, gave me a most cordial welcome, and spoke of the happy days we would spend in travelling together and collecting the beautiful shells which have made the Spice Islands famous among the students of nature in all parts of the world. The agent of the steamship line invited me to make his house my home while I remained in that part of the Archipelago and he also furnished me with ample space to preserve and classify my specimens, and this invitation was the more acceptable, as he and his good lady spoke English fluently. When I arrived in Batavia I found that all Europeans spoke to their servants in the Malay language only, and that even the natives when they voyaged from island to island could not communicate with each other except by using the same lingua franca. My first task, therefore, was to acquire a moderate vocabulary and a fairly ready use of that simple tongue, which has no harsh gutturals but is like the Italian in its musical sounds. The natives always recognized from my speech that I was not a Hollander before I had described to them my home in the remote land of America. As soon as I was thus pleasantly established at Amboina, the nativesbegan to bring me shells in great quantities including the species I had always regarded as the rarest and most valuable. At first I bought them by the basketful until all the more common kinds had been obtained, and then I showed my helpful friends the figures in Rumphius's book of those species I still desired, and the same time I offered them an extra price for others not represented in that comprehensive work. One mollusk I was particularly anxious to secure alive. It was the pearly nautilus.

The shell has always been abundantly found on all these shores, but the animal has been very rarely seen. The first one known to science was discovered in this locality and a description and an illustration of it were given by Rumphius. Afterward a most skilful dissection of one was made by Professor Owen of the British Museum and his monograph probably contains one of the most complete anatomical descriptions that has ever been made of any animal from a single specimen. He worked, as he himself described it to me, with a scalpel in one hand and a pencil in the other, and so little escaped his attention that nothing important has been added by later investigators. Only the second day after my arrival, to my inexpressible delight a native brought me one that was still living. It had been taken in this way. The natives throughout the Archipelago rarely fish with a hook and line, as we do, but where the water is too deep to build a weir, they use instead a bubu or barrel of open basket-work of bamboo. Each end of this trap is an inverted cone, with a small opening at its apex, like our lobster-pots. Pieces of bait are suspended within, and the bubu is then sunk on to clear patches of sand on a coral reef or more commonly out where the water is from twenty to fifty fathoms deep. No line is attached to those on the reefs and they are drawn up with a gaff. Those placed in deep water are buoyed by a cord and a bamboo, to one end of which a stick is fastened which floats in a vertical position, and to this is attached a piece of palm-leaf for a flag, in order to make it easily discovered. In this case it happened one of these bubus had been washed off into deeper water than usual, and the nautilus chanced to crawl into deeper water than usual, and through the opening of one of the cones in order to feed on the bait inside. If the opening had not been much larger than usual it could

not have got in. I at once placed it in a can containing a strong arrack and it is now safe in the New York Museum. I then offered twice the price paid for this one for a duplicate specimen and hundreds of natives tried, and tried in vain, to procure another during the five months I was journeying in those seas. They are so rare, even there, that a gentleman who has made a large collection of shells at Amboina, assured me that I ought not to have expected to have obtained another, if I had collected in those seas for three years. Rumphius, who is usually remarkably accurate in his descriptions of the habitants of the mollusks he figures, says it sometimes swims on the surface of the sea, but this statement he probably repeats from the natives, who made such a mistake because great numbers of its empty shells are frequently found floating on the ocean. When the animal dies and becomes separated from its shell, the latter is lifted to the surface by the gas contained in its closed chambers. Of course this animal has no affinity with the Physalia or "Portoguese-man-of-war," which we frequently see sailing over the temperate and tropical waters of our Atlantic, and which is an air-sac that floats a colony of animals allied to jelly-fishes. This is the "Chambered Nautilus", so accurately described by Doctor Holmes in his famous poem,

"This the ship of pearl, which poets feign,
Sails the unshadowed main,
x x x x x x x x x x x x x
Build thee more stately mansions, Oh! my soul,
As the swift seasons roll.
Leave thy low-vaulted past,
Let each new temple, nobler than the last,
Shut thee from heaven, with a dome more vast,
Leaving thine out-grown shell by life's unresting sea."

My first excursion from the city of Amboina was with a gentleman to a large cocoa garden, which he had recently planted on the high hills on the opposite side of the bay. A nice boat or <u>orangbai</u>, - literally a "good fellow" took across to the other shore. The boat-

men were gaily dressed in white trousers with red trimmings, and had red handkerchiefs tied round their heads. A small gong and a tifa or native drum, made by tightly stretching a piece of the hide of a wild deer over the end of a short, hollow log, gave forth a rude, wild music that at least served to aid the boatmen in keeping time as they rowed. Occasionally, to lighten their monotonous labor, they sang a low, plaintive melody. Instead of steering straight for the place at which we wished to arrive, on the opposite shore, our helmsman kept the boat so near the shore that we really passed round the head of the bay, so that our course over the calm water was twice as long as it would have been in a right line. This mode of hassar steering, or, as the sailors express it in our language, "hugging the shore," I afterward found was the custom universally adopted among all these islands. Near where we landed, the villages were boiling down the sap of the sugaru-palm for the sugar it affords. According to my taste it is much like maple-sugar. Up to the time that Europeans first came to the East, this was the only kind of sugar known to the natives, and large quantities of it are still consumed in all this region. As I had been steaming near the shores of many islands I could not but wonder, what marvels would be revealed to one, who had been accustomed to the monotonous forests of our temperate zone, when he was privileged to wander among the grand trees and through the dense jungles which cover these tropical lands, and this opportunity I was now to enjoy. From the beach a narrow footpath led through a grove of palms into a thick forest, and then zigzagged up a steep hillside until it reached a small plateau. Here were the young cocoa-trees bearing, not at the tips of the branches, but on the trunk and larger limbs their green and red pods in the form of our cucumbers. The native forest had been felled and burned, and

these trees, originally discovered in Mexico, had been planted in its place; and here they thrive so well, that they are supplanting the clove trees, which first induced European sailors to explore these seas.

The chief article of food of the natives working in this garden is our own yellow Indian corn, another exotic introduced from the New World.

Our house in this luxuriant tropical garden was merely a bamboo hut, with a broad verandah, which afforded us an ample shelter from the heavy rains and scorching sunshine. I had been careful to take along my folding-piece, and at once I began a rambling hunt through the surrounding forest. After a long walk over tangled roots and fallen trees in the dense and almost gloomy jungle, evening began to approach and flocks of beautiful red and green parakeets gathered in tall trees that were filled with large flowers, and I secured a fine series of these richly-colored birds. In these tropical lands when the sun gets low it is high time for the hunter to forsake his fascinating sport and hurry homeward, for there is no long fading twilight as in the temperate zone, but the sun seems to move more rapidly as it approaches the western horizon, and then suddenly to drop down out of sight and at once, it is night. On my return, my friend surprised me by the remark that I had brought home a good supper for us both, and before I would make a reply, our cook had torn out a large handful of brilliant feathers from the breasts of my specimens and they were spoiled for my collection. However, I consoled myself with the thought that it did not fall to the good lot of every hunter to live in the midst of such wondrous vegetation and feast on birds of such rich plumage. In the evening a full moon shed broad

oscillating bands of silver light, through the large polished leaves of the bananas around our dwelling, as they slowly waved to and fro in the cool, refreshing breeze. Then the low cooing of coves came up from the dark forest and the tree-toads piped out the long, shrill notes of their peculiar calls when the daylight is gone. That universal pest, the mosquito, was also there, singing his same blood-thirsty tune in our ears.

Our beds were perched up on bamboo poles, high above the floor of bare earth, so that we might hope to better escape such unpleasant bed-fellows as large snakes, which are very common and frequently awaken the sleeper by the rustling noise they make in the dark while hunting for rats in the dry palm leaves that form the roof of those primitive dwellings. Exactly the experience which I then feared, I now find that Mr. Alfred Russel Wallace did have in a cocoa garden on the same part of the same island. The snake in his hut "was about twelve feet long and very thick, capable of doing much mischief and of swallowing a dog or a child." That night we were disturbed but once, and then by a loud rattling of iron pots and a heavy crashing of crockery. Instantly I awoke with an indefinite apprehension that we were visited by one of the fearful earthquakes, which my host had been vividly picturing before we retired. The natives who were sleeping around us set up a loud shouting, and finally the cause of the whole disturbance was found to be a lean, skulking dog that was attempting to satisfy his hunger on what remained of our parrot stew.

But my chief object on this excursion was to collect insects; and among some white leaved shrubs, near the shore, I found many magnificent specimens of two kinds of very large and beautiful butterflies of the spur-winged family of Papilio. The general color of the upper surface of the wings of one species was a blue black, and be-

neath there were large patches of bright red. The other was of the same color above, but with large spots of bright blue; the wings of these splendid creatures expanded five or six inches and as they slowly sailed downward and glided by me, it almost seemed as if they must have come from some superior world, and the thrill of surprise and delight I then enjoyed have frequently blessed my memory for over forty years. This was the experience of my first day and first night in a tropical forest and it was often repeated with even greater interest, for the pleasure of constantly meeting new and unexpected forms of animal life is one that never palls but steadily increases, with wider observation and more exact knowledge.

To procure the species, which Rumphius figures and be able to identify my specimens with the drawings, beyond the possibility of error I now began to carry out my original plan of journeying along the shores of Amboina and the neighboring islands. Moreover the method of collecting would enable me to gather nearly all the species alive and thus secure ample material for studying their anatomy. I now realized the value of the Governor-General's letter for I had only to apply to the Assistant-Resident, and he at once kindly ordered a boat and coolies for me at the same rate as if they were employed by the government, which was frequently less than half of what I should have been obliged to pay if I had hired them myself; and besides, many times I could not have obtained boats and coolies at any price; but when a Dutch official ordered them to assemble at a certain hours, I always found them ready.

My first excursion along the shores of the island was on the coast of the northern part, known as Hitu. Two servants accompanied me to aid in arranging the shells and in carrying bottles of alcohol

to contain the animals. A boat took us over the bay to a landing where several coolies were already waiting with a "chair" to carry me over the high hill to the ocean shore. This "chair", or palanquin, is merely an arm-chair, with a long bamboo fastened on either side. A light roof of palm leaves and curtains on the sides keep out the rain or hot sunshine. Usually eight coolies are detailed to each chair, so that one half may relieve the others at short intervals. From the shore we climbed ranges of hills. Our road for most of the way was bordered on either side with rows of pine-apples, Ananassa sativa, which is a native of tropical America but it thrives so well on all these islands that it is very difficult to realize that it is not an indigenous plant. From the crest of the first range of hills we descended to a deep ravine and crossed a bridge thrown over a foaming torrent. This bridge, like most in these Dutch possessions, was crossed with a roof, but left open on the sides. The purpose of the roof and projecting eaves is to keep dry the boards and planks beneath, for wherever they are soaked by the frequent rains they quickly decay in this tropical climate. The coolies here lunched on smoked fish and sago-cake, their usual fare, and quenched their thirst with draughts from the rapid stream. Their ragged clothing and uncombed hair made them appear in marked contrast with the luxuriance and beauty of the surrounding vegetation. Descending from the high forests of the hills into a grove of cocoanut palms, which always show where the natives live on the shores of these islands, we were heartily welcomed by the rajah, who assigned me a chamber in his house. Large numbers of natives quickly gathered, and my host explained to them that I had come to buy shells, insects and every curious thing they might bring. As it was then high water and the

more valuable shells can only be obtained at low tide, I asked them to search for lizards, and soon I was surprised to see them coming with a number of real "flying dragons", not such impossible monsters as the Chinese delight to place on their temples and vases, but little lizards, the Draco volans each provided with a broad fold in the skin along either side of the body, analogous to that of our flying-squirrel and for a similar purpose, not really for flying, but to act as a parachute and sustain the animal in the air, while it makes long leaps from branch to branch. As the tide receded, shells began to come in; at first the more common species, and rarer ones as the ebbing ceased. My mode of trading with these people was extremely simple and completely avoided any unpleasant discussion. A small table was placed on the verandah along the front of the rajah's house and I took a seat behind it. The natives then came up separately and placed their shells or each lot of shells in a row on the table, and I placed opposite each of them, whatever price I was willing to pay and then, pointing first to the money and then to the shells simply said "Ini, atau itu" "This or that," leaving them to take their choice. In this way all our transactions were mutually satisfactory and the trading went on rapidly. It was a pleasure, that no one but a lover of shells could apprdciate, to see such rare and beautiful specimens coming in alive as spotted cypraeas, marbled cones, long Fusi, and Muricas some with spiny and some with richly ornamented varices resembling compound leaves.

The rarest shell that I secured that day was a living Tuebellum, which was picked up on a coral reef before the village, a low-tide level. Afterward I procured another from the same place, but so limited does its distribution appear to be that I never obtained a live

specimen at any other locality.

At sunset I walked with the rajah along the shore of the bay. Before us lay the great island of Ceram, which my companion called in his musical tongue, "Ceram taua biaa", "The great land of Ceram," for, indeed it was to him a land, that is a continent, and not in any sense a pulo or island. The departing sun was sinking behind the high, jagged peaks of Ceram, and his last golden and purple rays wavered to and fro as they shot over the glassy but gently undulating surface of the bay, and the broad, deeply fringed leaves of the cocoa-nut palms on the beach took on a deeper and richer hue in the glowing sunlight. Then a dull heaving booming came out from a small Mohammedan mosque, which was picturesquely located on a little projecting point where it was almost surrounded by the purple sea. This was the low rolling of a heavy drum, calling all the faithful to assemble and return thanks to their Prophet at the close of the departing day. The rajah then left me to wander along the shore alone, and enjoy the endless variety of the changing tints in the sea and sky while the daylight rapidly faded away along the western horizon.

It was in this bay that the Dutch first cast anchor in these seas, and the memory of this fact naturally carries us back to the early history of these Moluccas, so famous for their spices, and so coveted by the leading nations of Europe, as soon as energy and enterprise began to dispel the dark clouds of ignorance and superstition, which had enveloped the whole of the so-called civilized world during the middle ages. Antonio D'Abreu, a Portuguese captain, who came here from Malacca, in 1511, one hundred and nine years before the Pilgrim Fathers landed in our western world at Plymouth, is generally regarded as the discoverer of Amboina and Banda. Valentyn, the Dutch

historian of the Orient, states that the Javanese and Arabs, visited these islands to purchase spices as early, at least as 1322. The Dutch first came to the East in the employment of the Portuguese, and in this manner became acquainted with its geography and its natural resources. Their earliest expedition sailed from Holland in 1594 under Admiral Houtman. His fleet first called at Bautam and the island of Madura, and arrived here off this village of Hitu-lama, "Old Hitu", on the 3rd of March 1599; eighty eight years after the first coming of the Portuguese. A serious and continual warfare then began between the Spanish, the Portuguese and the Dutch for the possession of these Moluccas, which lasted until 1610, when the Dutch became masters of these seas and monopolized the lucrative trade of the nutmeg and the clove.

From this village I continued along the shore to Hila, which, in the days when the clove-tree was extensively cultivated on Amboina, was an important place, but not it is almost deserted. It is chiefly famous for its fine mangoes, the fruit of the Mangifera Indica. The Assistant-Resident there had two fine specimens in captivity of the great hermit-crab, Birgos latro. The habits of this animal are most remarkable. Its food is the cocoa-nut, and as the ripe nuts fall from the tree, it tears off the dry husks with its powerful claws until the end of the shell is laid bare where the black scars are found. It then breaks the shell, at this, its thinnest part, by hammering with one of its heavy claws, and the only fattening food within is taken out by means of the pincer-like claws attached to its hinder joints -- so perfectly is this animal adapted to its peculiar mode of life. They are esteemed great delicacies after they have been abundantly fed for a time, and these two unfortunates were destined to appear later at a Dutch banquet.

At the next village of Zyt I gathered another rich harvest of beautiful shells. Here I purchased many Tritons, which the natives had not found on their own shores, but had brought over from the neighboring coast of Ceram. They are closely allied to the Tritons of the Mediterranean, which in mythological times were fancied to be used by Neptune's attendants to herald the approach of the ocean god, when he came up from the depths of the sea and was whirled by his foaming steeds over its placid surface.

Near all these small settlements, the beaches are lined with cocoa-nut palms, and this is frequently the only indication that you are approaching a Kampong, or native village, unless, as occasionally happens, a thin column of smoke is observed slowly rising above the feathery crowns of the palms. When first I wished to take a supply of fresh water in our canoe, I naturally asked the rajah if he could provide us with a bottle, but he only smiled to find that I was so unaccustomed to tropical life, and ordered a servant to climb up one of the cocoa-nut palms near us and cut off some of its fully-grown but green fruit. These we could carry anywhere and open when we pleased, and a few strokes with a parang or heavy cleaver furnished us at once with a cool refreshing fountain.

At the village of Assilulu, I found the rajah living in the style which I had always fancied an Eastern prince enjoyed. His house was in the centre of a large village, and located on the side of a steep hill at the head of a beautiful bay. It covered three large terraces, and when viewed from the landing below, appeared from its surroundings decidedly imposing.

In the streets of this village considerable quantities of clove, which had been gathered on the neighboring hillsides, were exposed to the sun on mats between the frequent showers; but the culture of

that spice has been so neglected here in late years, that this was the only place where I saw a tree bearing fruit in all the Molluccas. The clove, Carophyllus Aromaticus, belongs to the order of myrtles, which also includes the pomegranate, the guava, and the rose-apple. The trunk of the tree isfrom eight to twelve inches in diameter. Its topmost branches are usually forty or fifty feet from the ground, though I have seen one not larger than a cherry tree fully loaded with fruit. It was originally confined to the five small islands off the west coast of Gilolo which then comprised the whole group known as "the Moluccas", a name which has since been extended so as to also include not only Gilolo, Ceram, Buru, Amboina and its neighboring islands, but also the Banda group, and Wallace adds to that even Timur Laut, the Ki islands and all the others that rise from a greater depth than the hundred fathom line which borders the northwestern side of Australia and the western side of New Guinea.

The abundance of cloves in these islands when they were first discovered, is shown by the fact that the two ships of Magellan's fleet which reached Tidore, were filled with cloves during a stay of only twenty four days.

When the buds are young they are nearly white, afterward they change to a light green, and finally to a bright red, when they must at once be gathered, which is done by picking them by hand, or by beating them off with bamboos onto sheets spread beneath the trees. They are simply dried in the sun which causes them to turn black, and then they are ready for the market. They are gathered twice a year, in June and December.

All the natives I met on this trip along the north coast of Amboina were strict Mohammedans, the principal men, improving the

privileges of their sect, had more than one wife. Soon after I arrived at each rajah's house, I was invariably asked whether or not I was married, and for a long time I could not imagine why I was so closely quizzed until the proverbial jealousy of these people occurred to me. Each wished to know how strict a watch he was to keep over his harem, which he considered very fascinating; and as I was always obliged to answer this query in the negative, I never saw one of their wives. At our meals the rajah and I were the only persons seated at the table, and as I had two servants and each of these princes had nearly a score, we were always well served. Two articles never failed to appear, curried chickens and rice - and to these fish was usually added, and always there was an abundance of the richest banannas. The rajah of Assilulu, was particular to place me at the table so that I could only look out of the front door. The first question he proposed at dinner was how we are accustomed to eat in our land, adding that, after all, no style suited him so well as dispensing with knives and forks al together and adopting the simpler and more natural mode of using one's fingers. While in reply I was zealously explaining the superiority of our custom, there arose a suppressed giggle behind me; the secret was out - the rajah's wives had been allowed to leave their close prison and come to watch me, while I had been seated so that I could not, without the greatest rudeness, turn round and steal a glance at them. But as this slight noise was evidently not a part of the proposed program, I repressed my curiosity and continued my description of our strange manners in America. There was one topic about which they were never weary of hearing and that was my experience as a soldier in our army. At first I had some difficulty in translating my stories into intelligible Malay

but one of my servants spoke a little Dutch and occasionally supplied me with the needed word or sentence, and so our conversation went smoothly on.

As I neared the southwestern end of the island, the stormy monsoon, which was then at its height, obliged me to abandon the sea and make my way by land. The heavy swell rolling in from the open ocean broke and flung its white spray and clotted foam far and wide over the black rocks left bare by the ebbing tide. Thick clouds, heavily freighted with rain, were driven by the strong wind against the rugged coast and adjoining mountains. The cocoanut palms that grew just above high-water level and leaned over toward the sea, twisted and shook their plumy crests in a continual strife with the angry storm and above them the branches of great evergreens moaned and piped as they lashed to and fro in the fitful gusts of the heavy gale, and yet these islands are never swept by typoons like those occurring on the coast of China.

On my return to the city of Amboina after such an excursion, several days were devoted to writing labels, one of which I placed on each individual shell, a long and weary task, but the thought continually occurred to me that, if I should not be permitted to return to my native land, such authentic labels in my own handwriting, giving the exact locality of each specimen, would enable any one into whose hands my collection might fall to accomplish fully the object of my long journey. This feeling of solicitude was not diminished by the experience that immediately followed.

July 23rd, 1865. This morning, at quarter past four, I was suddenly awakened by some cause, which, for the moment I could not understand; but immediately after there began a low heavy rumbling

down deep in the earth. It was not a roar but such a rattling or quick succession of reports as is made when a number of heavily laden coaches are rapidly driven down a steep street paved with round cobble-stones. At the next instant it seemed as if some huge giant had seized my bed, and had pushed it from him and then pulled it toward him with the greatest violence. The gentleman and lady with whom I was residing shouted out to me "Run out of the house! Run for your life! There is a dreadful earthquake."

Back of the main house was the dining room, surrounded by a low wall, and covered with a light roof of dry palm leaves. This was our place of refuge. The gentleman then explained to me that the shock which had just occurred was the second and a very severe one, and then I knew that it was the first and premonitory one which had aroused me from a deep sleep. Our suspense was great, for of course no one knew but that another and still greater movement of the earth might come at the next instant and lay all the buildings around us in a mass of ruins, if indeed a chasm did not open beneath us and swallow us all up, alive. The time that elapsed between the beginning of the rumbling noise and the shock itself was about five seconds. At this time of the year, in the middle of a monsoon, the wind blows steadily day and night; but after this earthquake there was not the slightest perceptible motion in the air. The tree-toads stopped their steady piping and the nocturnal insects all ceased their shrill music. It was so absolutely quiet that it seemed as if all nature was waiting in dread anticipation of some approaching catastrophe. To endure such an unnatural stillness was certainly more painful than the howling of the most violet tempest or the roar of the heaviest thunder. Meantime, lights began to spring up here and

there in the neighboring houses, and all their doors were quickly thrown open, that at the slightest warning everybody might run out into the street. The strange words and intonations of the Chinese, Malays, and Arabs sounded yet stranger in the dark, still night, as they called in a subdued but most earnest tone to their relatives and friends. The utter helplessness which every one feels in times of such danger, when even the solid earth groans and trembles beneath his feet, makes the solicitude painfully intense. It was half an hour - and that half hour seemed an age - before the wind again began to blow as usual. Then the nocturnal animals slowly resumed their nightly calls, and our alarm gradually subsided as the dawn appeared and once more gave promise of approaching day. I had long been desirous of witnessing an earthquake, and my friends all said what now proved true, "When you have experience one severe one, you will never wish to witness another."

Many of the residents of Amboina described to me a series of shocks of great violence that began on the first day of November, 1835, and continued three weeks. All the inhabitants of the city were then obliged to leave their houses and live for all that time, in tents and bamboo huts on the large common back of the fort. In 1850 a severe shock occurred and a gastric-bilious fever broke out and both the governor and the Assistant-Resident died of it. When I was there fifteen years later Amboina had regained its normal condition and was considered one of the healthiest places in all those seas.

East of Amboina lie three islands, Haru Ku, Saparua and Nusalaut, and as many of the most beautiful shells which I had purchased from the native dealers had been found on their shores, I was hoping that I might visit them, when a merchant from Saparua, who had come to our city, kindly invited me to accompany him on hisreturn.

Two miles up the bay from the City of Amboina a tongue of land projects out from either shore until a passage only five hundred yards wide separates them. Inside of this strait the sea again expands into a bay about three miles long and a mile and a half wide.

The water in this inner bay is as wonderfully clear as it is in all the surrounding sea, and its abundant animal and vegetable life in all their myriad forms and brilliant hues make the bottom with its varied depth even more fascinating and fairy-like than the most beautiful flower gardens on the land.

This is one of the places which the official guide-book of the steamship line particularly recommends all travelers to visit.

In the afternoon of our first day we came to the village of Tulahu on the north shore of Amboina, and at once embarked on a large prahu; for the usual time here to begin a sea voyage, is just before the close of the day, when the wind generally moderates and prepares to freshen again at sunrise the next morning.

Crossing a strait about half a mile wide, we came under the lee of the north side of Haruku, an oblong island, two miles long and one and a quarter broad. We kept near the shore, so that I could look down into the deep, clear water and distinctly see many round massive heads of the brain-coral, Meandrina; other graceful branching forms Astrea; broad sea-fans, Gorgonia; and hundreds of massive and tubular sponge, while fishes frequently darted to and fro, which were striped, banded and spotted with the most brilliant hues and in the most bizarre patterns. All this abundance of marine life was scattered over the varied relief of the sea bottom, which represented, in miniature, the cliffs, hills and valleys of the dry land, and made these submarine views one of the greatest attractions which the naturalist can enjoy in these tropical seas.

At the town of Saparua, my merchant friend gave me a nice room, and the Resident, who received me in the politest manner, said he was just then planning a tour of inspection to Nusalant, the most eastern island of the group, and would be happy to have me accompany him, an invitation I most gladly accepted, for the natives had been describing it as abounding in the most beautiful shells, and already I possessed a few rare species which had passed from one native dealer to another until they had reached me at Amboina. He also showed me some choice shells that had been sent to him as presents by the various rajahs. Two were magnificent specimens of that costly "wentletrap", the Scalana pretiosa, for which large sums were once paid in Europe. This and one cone were the only kinds of shells, which I saw or heard of during my wide travels among these islands of which I failed to obtain, at least, one good specimen.

Saparua Bay is one of the most beautiful inlets of these seas. Near its head rise the walls of an old fort. The other parts of the shore form a semicircular, sandy beach, which is bordered with such a dense grove of cocoa-nut palms that one looking from the water would not imagine that they concealed hundreds of native houses. Here myriads of sea-urchins, Clypeastridae, almost covered the flats near low-water level, and completely buried themselves in the calcareous sand as the tide left them. Where ledges of coral rock rose out of the water, countless numbers of the little money cowry, Cypraea moneta, filled the excavations formed in this soft stone. They are seldom collected here, as they are too small to be used for food, and these natives never use them as a medium of exchange, as has been the custom since the earliest ages in India.

August 17, 1865. At 5 A.M. started with the Resident for

Nusalaut. Our party included the doctor of the garrison, the "commandant" of the militia, my merchant-friend, the "Sheurman" or Captain and last (and also least) a mestizo scribe. A strong head wind with frequent squalls of rain made our progress slow till we reached a high headland which the natives called Tanjong O. (i.e. Headland O.) From that point over to Nusalaut, across an unsheltered strait, was two miles. As we left the shore and pushed out into the open sea, our progress was still slower. Inch by inch we gradually gained until we were half-way across, when the wind freshened, and for a time our oarsmen could hardly hold their own, despite the increased jargon from the drum and the gong and the wilder whooping from every native, varied by mutterings from each, to the effect that he was the only one who was really working. Almost the moment that these natives meet with any unexpected difficulty they become entirely disheartened and want to abandon their task at once, exactly like children.

Nusalaut, like most of the small islands in these tropical seas, is surrounded by a shallow platform of coral, which is mostly bare at low water. We therefore entered a narrow bay, where the deep water would permit our boat to come near the shore. Coolies then waded out with chairs on their shoulders and landed us dry-footed on the beach, where we were welcomed by a dozen natives clad in what they believed to have been the war-costume of their ancestors long before the arrival of Europeans. They were nearly naked and carried in their right hands large cleavers or swords (some of which I noticed were made of wood.) On the left arm was a narrow shield about four feet long, which was evidently more for show than for use, as it was only three or four inches wide in the middle. On the head was a

kind of crown, and, as long plumes were scarce, sticks had been covered with white hen-feathers and were used as a substitute. From their shoulders and elbows hung strips of bright red calico, to make them look gay or fierce. Their war-dance consisted in springing forward and backward, and whirling rapidly round. Formed in two lines, they fiercely brandished their swords in our faces, as we advanced between them to a little elevation, where all the rajahs had gathered to receive the Resident.

Nusalaut is less then two miles in length and, in some places, only half a mile wide. Its area, therefore, is somewhat less than a single square mile. A century and a half ago its population numbered five thousand, but at present it is only three thousand five hundred. The number of villages, and consequently of rajahs, is seven. As we entered the one nearest our landing, we found its main street ornamented in a most tasteful manner. The young, light-yellow leaves of the cocoa-nut palm had been split in two, and were bent into bows or arches, with the midrib uppermost and the leaflets hanging down like a fringe below. These bows were placed on the top of the fences, so as to form a continued series of arches; a simple arrangement that produced a most charming effect and in harmony with all the surroundings. As we marched along, scores of old, heavily-loaded flint-locks were discharged in our honor and these mimic warriors went through with their peculiar evolutions. At the next village our reception took on a new phase. In front of the rajah's house was a triumphal arch, made of boards and ornamented with two furious, red lions, which held up a shield containing a welcome to the Resident, as the representative of the Dutch government. But just before we reached that house the crowd in front parted, and lo, before us stood eighteen or twenty young girls, who had been selected from the whole village

for their beauty. They were all arrayed in their costliest dresses, which consisted of a bright-red sarong for a skirt and a low kabaya for a waist, over which was another of lace bespangled with many thin pieces of silver. Their long, black hair was combed straight backward and fastened in a knot behind, and in this was placed many long, flexible silver pins, which rapidly vibrated as they danced. Most of them had a narrow strip of the hair over the forehead clipped short, but not shaven, a most unsightly custom. Their lips were stained a dull brick-red from constantly indulging in the use of the betel-nut. They were arranged in two rows, and their dance, the minari, was nothing more than slowly twisting the body to the right and left, and, at the same time, moving the extended arms and open hands in circles in opposite directions. The only motion of their naked feet was to change the weight of the body from the heal to the toe and vice versa. During the dance they sang a low, plaintive song, which was accompanied by a tifa and a number of small gongs, suspended by means of a cord in a framework of gaba-gaba, the dried midribs of palm-leaves. The gongs increased regularly in size from one of five or six inches to one of twelve or fifteen inches in diameter. Each had a round knob or boss in the middle, which was struck with a small stick. When made to reverberate in this manner, their music was very agreeable and resembled closely that made by small bells.

All these natives were passionately fond of music, and perhaps in nothing has their inventive genius been so well displayed as in their peculiar musical instruments, which have been brought to the highest perfection in Java, where they are so elaborate that a set of eighteen or twenty pieces, for a complete band, costs from six

hundred to one thousand dollars. A number of these were taken to England by Sir Stamford Raffles and were carefully examined by a competent judge, who expressed himself "astonished and delighted with their ingenious fabrication, splendor, beauty, and accurate intonation."

While we were watching the slow graceful dance, dinner was announced, and we were summoned from the verandah to an open room in the rear of the house. The wife of the rajah was the only lady at the table; and, as all the princes and notables of the other villages were present, the number of guests who were ready to take seats was not small. Our bill of fare was sufficient to satisfy the most fastidious epicure; for substantial diet the neighboring forests had furnished us with an abundance of venison and the meat of the wild boar, and the adjoining bays had yielded several kinds of palatable fish. All this was prepared in an unexceptionable manner, and the rich display of fruit including pine-apples, mangosteens, dukus, and several kinds of bananas, was finer than many a European prince could set before his guests. Of all this abundant display of delicious tropical fruit, the Mangosteen is universally regarded as the choicest of all that thrives on these fertile islands. It is shipped from the Archipelago as far away as India. At Nusalaut it is as abundant as apples are with us in our orchards in autumn.

The process of demolishing had fully begun, when the dark beauties, who had been dancing before the house, came in and ranged themselves round the table. My first impression was that they had come to see how Europeans eat, and I only refrained from making a hint to that effect to the Resident on my right, because he had already smiled to see my surprise at our novel reception, and besides,

I was anxious not to appear to be wholly ignorant of their strange customs. Soon they began to sing, and this, I thought to myself, is probably what is meant by a sumptuous banquet in the Orient, and, if so, it well deserves the name. As the song progressed, one after another took out a handkerchief of spotless white, and folding it into a triangular form, began to fan the gentleman in front of her. This is indeed Eastern luxury, I said to myself, and while I was wondering what would happen next, the damsel behind the Resident leaned forward and gave him a loud kiss on his cheek. "That was intended as an appetizer I presume," I remarked. Natuurlijk, "Of course", he replied, and I leaned back in my chair to give way to a hearty laugh, which I had been trying for a long time to suppress, when suddenly I was astonished by a similar salutation on the lips! It was done so quickly that I had no time to recover from my bewildering surprise and coolly and severely explain, that such was not the custom in my land. Instead of my laughing at the Resident's expense, the whole party laughed at mine; but my embarrassment was alleviated somewhat by the assurance of all at the table that even the Governor General himself had to submit to such treatment when he came on an official visit to inspect these islands. Besides, I was made aware that the fault was largely my own, for when I leaned back to laugh, the fair one behind me had misinterpreted the movement as a challenge (which she certainly seemed not very loath to accept.)

At every village we had to run a similar gauntlet, and I must confess that several times it occurred to me that the youngest member of the Resident's company certainly received his share of such delicate attention, and that many of these beauties, nona itum, were determined to improve their present opportunity for fear that they

might never again have the privilege of kissing a gentleman with a white face.

The duties of the Resident, while on a tour of inspection, consist largely in visiting and examining the free public schools, of which there is one in every village. On Saparua also thirteen out of sixteen villages are each provided with a school, and on Haruku eleven villages are supplied with six schools, so distributed over the island as to be accessible to all. The facilities, therefore, afforded by the Dutch government for these natives to acquire a good common school education are far better than they are in many civilized lands. The teachers are employed by the government and are all well paid. Those on this island were all natives. They were remarkably awkward, probably because they felt dressed up; for, on such an important occasion as that of our visit, every one who holds a government office must appear in a black suit. Again and again I found it required great self-command to keep from smiling, when it was expected that I would appear very dignified and sedate; for here, on the outskirts of civilization, I beheld all the fashions of Europe, apparently for the last two hundred years. All the petty officials wore dress coats even in that hot climate, some with the tails almost dragging on the ground, and others with the sleeves so long that you could scarcely see the tips of their fingers, and still others with the waists so small that they seemed to be in corsets.

Some of these coats had narrow collars, and had evidently been worn by the most dainty exquisites in stately balls, while others had lapels broad enough for the outer coat of a coachman. As soon as the inspection is over, these precious articles are carefully rolled up and thoroughly smoked, to prevent their being destroyed by the ants. They are then laid away until the next year, when they are again

unrolled and at once put on, while one mass of wrinkles and giving out the strongest odors.

On entering the school-house the Resident is greeted with a speech of welcome, which has been prepared long before by the teacher and committed to memory by a small boy, who promptly steps forward, and, stretching out both arms at full length, repeats the oration at the top of his voice, occasionally emphasizing certain sentences by making a low bow, but taking care all the time not to bend his extended arms. This ordeal finished, the children join in singing a psalm, all keeping time by striking the forefinger of the right hand into the palm of the left. It was always amusing to see the little ones perform their part of this ceremony. The four classes into which each school is divided are now examined. The two younger classes in reading and spelling the Malay language, written in the Roman alphabet, according to the Dutch rules of pronunciation. The two older classes are likewise examined in these same branches, and also in penmanship, and the simple rules of arithmetic.

As I visited school after school, I became more and more surprised at the general proficiency of these children, and I am certainly of the opinion that they would compare favorably with the children of the same ages in our own country districts. This remarkable promise in childhood is not, however, followed by a corresponding development during youth and manhood.

The great obstacle to every kind of progress among these natives is, that only a few of them, if they have enough for today, will try to earn anything for tomorrow. The desire of all Europeans to have some money reserved for sickness or old age is a solicitude for the future, which these people appear never to experience, and such innate

improvidence is, unfortunately, encouraged from their childhood by the unfailing and unsparing manner in which nature supplies their limited wants. The possibility of a famine is something they cannot understand.

At Nullahia I purchased many beautiful "harp-shells", and also a few large cones which were formerly so rare that they have been sold in Europe for more than two hundred dollars apiece. The next day we continued on to Amet, the largest kampong, or native village, on the island. Here a good missionary was located, who was indeed like Melchisadek, "both priest and king". From this place he is accustomed to travel to the neighboring villages, preaching, teaching and exercising a general care over the conduct of his people; and the good results of his labors were well shown in the general spirit of thrift and order, which characterizes these villages as compared with the Mohammedan kampongs I had previously visited on the shores of Amboina. Every person in all these villages is nominally a Christian, and this, I believe, is the only island in the archipalago of which that statement can be made. The missionary, however, informs me that a few of his people occasionally steal away to some secret place among the hills where they practice their ancient rites, by making offerings to spirits, possibly those of their ancestors, which they were accustomed to worship before the introduction of Christianity. This village of Amet is probably the best locality in all the Moluccas to gather shells. The platform of coral, which begirts the island, extends out here nearly two English miles from the high-water level to where the heavy swell from the open ocean breaks along its outer edge, and all this flat area is either bare at low tide, or only covered to the depth of a few inches by small pools. Here,

among other beautiful shells that abound, are found the Mitra Episcopalis, or "Bishops mitre" and the Mitra papalis, or "Pope's mitre" and also many rare cones and cypraeas.

From Amet to Abobo, at the southern end of the island, a distance of more than a mile, the coral platform narrows until its outer border is quite near the high-water line. Along the whole length of this reef, the heavy swell from the wide ocean is seen now, in the height of the southeast monsoon, constantly rising up again and again into/long grand wall of water, which, slowly curling its high white crest, finally plunges headlong over the soft polyps, which despite the utmost efforts of the ocean, slowly but continually advance their wondrous structure seaward. This endless lashing and washing of the waves, which would wear away the most adamantine rocks, only enables these delicate animals to work with greater vigor, and this is probably the chief reason that the reef here, at Amet, is wider than anywhere else along the shores of the neighboring islands.

Between Amet and Abobo, there is sometimes found a very beautiful cone covered with mottled bands of black and salmon-color, which once commanded fabulous prices in Europe, and is still regarded by the natives as the most valuable shell obtained in these seas. Although I traveled along nearly all the shores of the adjacent islands, I was continually assured that this part of Nusalunt was the only locality, where this shell was ever found, an assertion which I regard as correct, so sparing is nature of her choicest treasures.

After making a voyage to the south coast of Ceram I returned to Amboina.

Banda.

Two months had now passed since I arrived at that city, and I found that I had not only collected all the shells figured in Rumphius's "Rariteit Kamer," which was the work I had come to the distant Orient to accomplish, but I had secured more than twice as many other species beside. I was, therefore, ready to visit some other part of the Archipelago, and also to turn my attention to a different branch of natural history. During all the time I had been gathering and carefully packing my collection of shells, Governor Arriens had frequently honored me with a visit, and, as I was finishing my allotted task, he called again, this time to give me a genuine surprise. He had a fine steam yacht of three or four hundred tons, and it was necessary that he should visit Banda, and he took it for granted that I would accompany him. If I had been able to plan for myself, what could I have imagined more desirable, especially when he added that when we returned to Amboina, there would be an item of business for his yacht to do on the north coast of Ceram, which I could also visit, though alone, and that when she returned a second time we would go together to Ternate and taking on board the Resident located there, proceed to the north coast of Papua - a royal programme indeed.

Sept. 7, 1865. At 5 P.M. we steamed down the beautiful bay of Amboina for Banda. The rainy season was now over and this evening was clear, cool and delightful. Early the next morning Banda appeared on the horizon, or more correctly - the Banda Islands, for they are ten in number. The largest, Lontar or Great Banda is a crescent-shaped island, about six miles long and a mile and a half wide in the broadest part. The centre of the circle, of which Lontar is an arc, falls in the narrow passage called Sun Strait, which

separates Gunong Api, or "Burning Mountain" from Banda Neira. Passing through this strait we entered a most beautiful and perfectly sheltered bay, which is probably the crater of an old volcano, of which Gunong Api is the present active vent, as Vesuvius is the active cone of the old volcano of Somma. On the north side of this circular harbor is the chief town, Neira, on the island of Banda Neira. It occupies several terraces, and unlike the other ports where the mail steamer calls, and which can only be partly seen from the anchorage, it forms a conspicuous feature in the charming landscape. The white walls of the dwelling houses are made of coral-rock or bricks and are two or three feet thick and covered with plaster on the exterior. At short distances, on their outer side, sloping buttresses are placed against them, as a necessary protection against the frequent earthquakes. Along the bund or front street are rows of fine shade trees bordering the bay.

A number of Bugis traders, from Macassar were anchored near by. They visit the eastern end of Ceram and the neighboring coast of Papua and the Aru Islands. When the mail steamer that took me to Amboina touched here on her way, a merchant who joined us, brought on board four living specimens of the Paradisea apoda or "Great Bird of Paradise," which he had purchased a short time before from one of these vessels and was taking them with him to Europe. They were all very active, and their colors had a bright, resplendent hue, incomparably richer than the most magnificent specimens I have ever seen in any Museum. Subsequently I learned that two of them were still alive when he reached France.

In 1609, after a long war with the natives and the Portuguese, the Dutch became the sole possessors of this coveted prize, but there were no people to cultivate the nutmeg trees, and they were obliged

to import slaves to do this labor.

When slavery was abolished throughout the Dutch possessions, convicts were sent from Java to make up the deficiency, and at this time there are about three thousand of them in all these islands. They are a most villianous-looking set, and have been guilty of the bloodiest crimes. They are obliged to wear around the neck a large iron ring, weighing a pound or more. It is not so heavy that it is difficult for them to carry, but is designed, like the States-prison dress in our country, to show that they are common felons. It is bent round the neck and then welded, so that it can only be taken off by means of a file.

The Governor began his tour of inspection on the southern end of the island of Lontar. On its outer side many radiating ridges descend to the sea, so that its eastern shores are a continued series of picturesque headlands separated by small bays. The whole island is covered with a luxuriant forest of nutmeg and canari trees. The trunk of the former is from six to ten inches in diameter a foot above the ground. It branches like the laurel, and its loftiest sprays are frequently fifty feet high. It is dioecious, that is the pistils and the stamens are borne on different trees and of course some of them appear to be unproductive. The fruit, before it is fully ripe, closely resembles a peach that has not yet been tinged with red, but this is only a fleshy outer rind, the epicarp, which soon opens into two equal parts, and discloses within, a spherical, black, polished nut, surrounded by a finely branching aril, the mace, which is of a bright vermillion. In this ripe condition, it is probably one of the most beautiful fruits in the whole vegetable kingdom. It is now picked by means of a small basket fastened to the end of a long bamboo. The outer part being removed, the Mace is

refully taken off and dried on large, shallow bamboo trays in the sun. During the process its bright color changes to a dull yellow. It is now ready to be packed in nice casks and shipped to market. The black, shining nut, seen under the ramifications of the vermilion mace, is really a shell, and the nutmeg is within. As soon as the mace is removed, the nuts are taken to a room and spread on shallow trays of open basket-work. A slow fire is then made beneath them, and here they remain for three months. By the end of that time the nutmeg has shrunk so much that it rattles in its black shell. The shell is then broken, and the nutmegs are sorted and packed in large casks of teak-wood, and a brand is placed on the head of each cask, giving the year the fruit was gathered and the name of the plantation or "park", where it grew.

A stroll through these beautiful groves would be one of the richest treats a traveler could enjoy, even if he took no interest in the history of the rocks beneath his feat. All the nutmeg-trees were loaded down with fruit, which is chiefly gathered during this month of September and again in June, though some is obtained throughout the year. It seemed surprising that these trees could bear so abundantly season after season, but the official reports show that there has been little variation in the annual yield for the last thirty years. An average crop for the past twenty years has been about 580,000 Amsterdam pounds of nuts and 137,000 pounds of Mace. The number of trees may be estimated at 450,000. As the Governor remarked to me, while I was expressing my wonder and delight at the abundance of fruit on every side, it is indeed, strange that the income of the government does not equal its expenses on these islands. Beneath the trees is spread a carpet of green grass, while high

above them the gigantic canari trees stretch out their gnarled arms to shield the valuable spice trees entrusted to their care from the strong winds, which strive in vain to make them cast off their fruit before it is ripe. Such important service do the tall canaris render in this way, that they are plated everywhere, and when the islands are seen from a distance the tops of these trees completely hide the nutmeg-trees from view. The roots of the canari are most remarkable. They spring off from the trunk above the ground in great verticle sheets, which are frequently four feet high - where they leave the tree, and they wind to and fro for some distance before they disappear beneath the soil, so that the lowest part of one of these old trees might well be fancied to be a huge bundle of enormous serpents struggling to free themselves from a Titanic hand that held them firmly in its grasp.

As we were carried in chairs by many natives under the thick foliage that effectually shut out the direct rays of the hot sun, we came out to a lookout which is placed on the edge of the interior wall of the island and is about six hundred feet above the sea. From this point most of the Bandas are distinctly seen in a single glance, and this view is undoubtedly one of the most charming to be enjoyed among the isles of all these tropical seas. Before us was Banda Neira, with Neira, its pretty village, and to the left of this the dark, smoking volcano of Gunong Api, and beyond both, on the right, Banana Island, where a colony of lepers live in solitary and perpetual banishment, and still farther seaward, Ship Rock, with the white-crested swell chafing its abrupt sides; while, on our left in the distance were Pulo Ai and Pulo Run, all rising out of the dark blue sea, which was only ruffled here and there by light breezes or fleck-

ed by shadows of the pearl-colored clouds that slowly drifted across the sky.

When the governor had finished his examination of the "parks", he proposed that we try to reach the top of the volcano, and while we were sitting on the veranda of the Resident's house, discussing the necessary preparations, there came a sudden jar, and instantly without delay or ceremony everybody darted down the steps into the open roadway - there was an earthquake - and no one could tell but that at the next instant a shock might come, severe enough to lay the whole house in ruins. These alarming phenomena occur here, on an average, once a month, but, of course no one knows when that one may occur or what destruction it may cause. Such is the unceasing solicitude that all the inhabitants of these beautiful islands have to suffer. The governor had ascended fifteen volcanoes on Java, some of them with the famous geologist, Dr. Junghuhn. There was only one native who had ever been to the top and claimed to know the way, and he was engaged as a guide. Ten others accompanied us to carry an ample supply of water in long bamboos. A number of officials asked permission "to go with His Excellency", but the next morning only two appeared; the daring and devotion of the others having apparently been dispelled by portentous dreams.

From Banda Neira we crossed the "Strait of the Sun" to the foot of the mountain. Some coolies had proceeded us to clear away a path up the steep acclivity; but soon our only road was the narrow troughs where large masses of rocks and sand, which had been loosened by the abundant rains had shot downward in a series of small landslides, ploughing up the low shrubbery in their thundering descent. As long as we climbed up among the small trees, although it was tiresome, it

was not difficult, until we came out on the naked sides of the mountain, for this peak is not covered with vegetation over more than two-thirds of the distance to its summit. This bareness is caused by frequent and wide land-slides and by the great quantity of sulphur brought up through the interior by sublimation and washed down by the heavy rains. Here we were obliged to crawl on all fours among small, rough blocks of porous lava, and we spread out into a horizontal line on the mountain-side, so that when one of our party loosed several rocks, as constantly happened, they might not come down on some one beneath him. Our ascent now was slow but we kept on until we were within about five hundred feet of the summit, when we came to a horizontal band of loose angular fragments of lava from two to six inches in diameter. At this place the mountain-side rose up at an angle of at least thirty five degrees. The band of stones was about two hundred feet wide, and all were so loose that when one was touched it would carry half a dozen others with it down the mountain. I had got about half-way across this difficult place, when the stones on which my feet were placed gave way. This, of course, threw my whole weight on my hands, and at once the rocks to which I was clinging also became loosened, and I began to slide downward. The natives on each side of me cried out, but no one dared to try to stop me for fear that I would carry him down also. Among the loose rocks, a few ferns grew up and spread out their leaves to the sunlight. As I felt myself sliding down, I rolled over onto my right side, and noticing one of the ferns, caught it quickly and buried my elbow deep in the loose rocks, and fortunately, this grasp and movement of my arm held me fast, and I turned over and kept on climbing. Above this band of loose stones the surface of the mountain was covered with a crust formed chiefly of sulphur. Here again we were making good progress,

when the natives above us shouted out, "Look out! Look out! - Great rocks are coming!" and the next instant several small blocks, and one great flake of lava two feet in diameter bounded by us with the speed of lightning. "Here is another". It is coming straight for us, and it will certainly take out one of our number, I thought, and I crouched down, in the groove where I was climbing, hoping that it would leap over me; and at that instant a piece of lava a foot square bounded up from the mountain and passed directly over the head of a coolie a few feet on my right, clearing him by not more than five or six inches. When we reached the top, the mystery concerning the falling stones was soon solved. One of our number had reached the summit before the rest of the party, and, with the aid of a native, had been tumbling off large stones for the sport of seeing them leap down the mountain, having stupidly forgotten that we all had to wind part way round the peak before we could get onto the rim of the crater, and, therefore, that those still climbing must be directly beneath him.

The whole mountain is merely a cone of small angular blocks of trachytic lava and volcanic sand, and the crater at its summit is only a conical cavity in this incoherent mass. The whole area on the top is elliptical in form, and about three hundred yards long and two hundred wide; and the small crater is some eighty feet deep and one hundred or one hundred fifty feet in diameter. The blocks of lava, which are black within, are whitened on the surface by the action of sulphurous-acid and other gases which are rising with the escaping steam; and we hurried round to the windward side to be out of their suffocating fumes and in many places we were glad to run, to prevent our shoes from being scorched by the hot rocks. When we reached the highest point of the rim, we leaned over and looked directly down

into the great active crater, a quarter of the distance from the place where we stood down to the sea. Dense volumes of steam and other gases were rolling up, and only now and then could we distinguish the edges of the deep, yawning abyss. Here we rested and lunched, enjoying meanwhile a magnificent view over the whole Banda group when the strangling gas was not blown into our faces. It was now time to descend and I chose a place where the vegetation was nearest the top. I had brought with me an alpen-stock or long stick slightly curved at one end, and with this I reached down and broke places for my heels in the crust that covered the sand and loose stones. In this way I had worked my way down for a hundred feet, when I was startled by a shout of warning from my companions, and on looking round I found I was on a tongue of land between two long, deep fissures, where great land-slides had recently occurred, so that I was obliged to climb up again and pass round the head of one of those frightful holes, and after that the descent was comparatively easy and safe. With a little previous preparation a good pathway could be made to the summit and a grand outlook provided for the many travelers who in the future will seek to enjoy a comprehensive survey of the unrivalled beauty of the Banda Islands.

Returning to Amboina, the Governor's yacht took on coal, and on September 25th once more steamed down the bay. Only three months had passed since my arrival, but I had been through so many and such new experiences that Amboina appeared to have been my home for a twelve-month, and so now it still seems after a period of forty-three years.

From the north coast of Ceram the yacht took me to the island of Buru, where the Governor proposed that I should remain five days, when he would come and we would proceed together to Ternate. The

controleur of this port kindly invited me to his house near the surrounding forest, and there I was accustomed to ramble to and fro hour after hour until I knew all the favorite haunts of most of the birds; yet during nearly every day of my long stay I secured specimens of a species which had not been represented in my collection before. Soon after I arrived, a tree, as large as our oak, became filled with great scarlet flowers, and in the early morning flocks of luris (Eos rubra, Gml.) and other Parrakeets with blue heads, red and green breasts, and the feathers on the under side of the wings of a light red and bright yellow, (Trichoglossus cyanogrammus, Wagl.), would come to feed on them. It was easy to know where those birds had begun their morning feast by their loud, unceasing screeching and chattering; and, after stealthily creeping through dense shrubbery for hundreds of yards, I would suddenly behold one of these great trees filled with scores of such brilliantly plumaged birds flying about or climbing out to the ends of the branches, and using their wings to aid in poising themselves, while they made a dainty breakfast on the rich flowers and on the insects which gathered to feed on the sweet juices. These are indeed the birds that Moore describes as --

"Gay, sparkling loories, such as gleam between
The crimson flowers of the coral-tree
In the warm isles of India's sunny sea."

Just as the Governor was departing from Amboina, news came that a great revolt had suddenly broken out in Ceram, and it was three months before I could continue my journey, but I had so improved this opportunity to collect the rare and beautiful birds of this almost unexplored island, that the result of my enjoyable labors was seventy-six species, represented by over four hundred specimens, nine-tenths of which I had shot myself, while my native hunters had skilfully

prepared them for the long voyage to Batavia and around the Cape of Good Hope to America.

On our voyage northward to Ternate we passed the island of Makian, which is the remnant of an old volcano, which, in 1645 underwent a fearful eruption that entirely destroyed all the villages on its flanks. It is said to have at one time a population of seven thousand souls. After this destruction it was again settled, and in 1855 it contained six thousand natives. In 1862, this slumbering volcano again burst forth, destroying nearly every person on the whole island.

Steaming by night between the high, sharp peak of Tidore on our right and the historic volcano of Ternate on our left, the morning found us anchored off the village of the latter island in a large and well sheltered bay. As the sun arose we beheld a scene that was both imposing and charming - imposing when we looked upward to the summit of the burning mountain, rising to a height of five thousand four hundred feet above us - charming, as we looked below the level water-line on the shore, and beheld the whole, grand picture perfectly mirrored beneath, on the surface of the quiet sea. The whole island is merely the upper part of a great volcanic cone, whose base rests deep in the ocean. The last great eruption occurred on the 25th of March, 1838. A heavy thundering roared in the earth, thick clouds of ashes filled the air, and streams of glowing lava poured down the mountain. On the 2nd of February of the following year, at nine o'clock in the forenoon a yet more severe eruption came. Smoke and ashes were poured out, and hot stones rose from the crater and fell like hail on the sides of the volcano, setting fire to the dense wood, which had grown up since its previous great explosion, one hundred and sixty five years before. The burning forest gave the

peak the appearence by night of a mountain of flame. On the 14th half an hour after midnight, a frightful, unearthly, thundering began and the shocks grew heavier and more frequent until half past three, when the last house left standing in the whole place, was laid in ruins. The earth split open with a cracking that could be distinctly heard above the awful thundering of the mountain. Out of the fissures jets of hot water rose for a moment, and then the earth closed again, to open in another place. An educated gentleman, who from his great wealth and generosity was justly known as "the Prince of the Moluccas", assured me that when two men stood about one thousand yards apart, one would see the other rise until his feet seemed to be as high as the head of the observer, then immediately he would sink and the observer rise until he seemed as much above his fellow as he had been below him before. For fifteen hours the solid ground thus rolled like the sea, but the heaviest wave did not occur until ten o'clock on the next day. Fort Orange, which had withstood all the shocks of two hundred and thirty years was partly thrown down, and wholly buried under a mass of pumice stone and the debris of the forests above it. The people, as soon as this last day of destruction commenced, betook themselves to their boats, for, while the land was heaving like a troubled ocean, the sea continued quiet; no great wave came in to complete the work of destruction on the land. It seemed indeed, as if the laws that govern these two great elements, had been suddenly exchanged and the fixed land had become the mobile sea. The whole loss caused by this devastating phenomenon was estimated at four hundred thousand Mexican dollars; and yet, after all this experience, so great was the attachment of both foreigners and natives to this particular spot, that they would not select some other

location less dangerous on the neighboring shore of the same bay, but all returned and once more began to rebuild their houses for another earthquake to lay low in the dust, proving that the common saying in regard to them, is literally true, that "the inhabitants of Ternate are less afraid of fire than the Hollanders are of water."

On the 8th of November 1521 the fleet of Ferdinand Magellan anchored here off Tidore. On the 20th of September 1519, he sailed from the port of St. Lucas in Spain, with "five small ships of from sixty to one hundred and thirty tons," his object being to find a western passage from the Atlantic to the Indies and particularly to these Spice Islands.

Magellan was a Portuguese nobleman, but he sailed under the patronage of Charles V of Spain. He passed through the strait which still continues to bear his name with three ships, one having been wrecked, and one having turned back. For one hundred and sixteen days he continued sailing in a northwesterly direction, over (as it seemed to them) an endless ocean. The first islands they saw were named by Magellan the Landrones or "Islands of the Thieves". From these he came to the Philippines, and on one of them named Mactan, near Cebu, he was murdered by the natives, as was also Barbosa, a gentleman of Lisbon, who had previously visited and described India.

In 1546, Francis Xavier, a Catholic priest, visited this island of Ternate. He afterwards went back to Malacca and proceeded to China and Japan, and returning from the latter country died on an island off Macao, near Canton. The Dutch first came to Ternate, under Admiral Houtman, in 1578. In 1605 they stormed and took the Portuguese fort here, and in 1664 dislodged the Spaniards from Tidore and thus became complete masters of the whole Moluccas, a control

which they have kept in their own hands ever since.

As this is the chief port for all this part of the Dutch possessions, including a large part of New Guinea, I improved the opportunito to secure some rare birds-of-paradise from that far eastern land, and one of these was so seldom seen in Europe that when I came to London I sold it to Mr. John Gould and it is tday on exhibition with his great collection of humming birds in the British Museum of Natural History at South Kensington.

While I was engaged in purchasing these rare treasures, the man-of-war stationed here to watch for pirates in the Molucca Passage, between this island and the northern end of the Celebes, came into port. She would return immediately to Kema, a town on the northern peninsula of Celebes, and her commander kindly offered to take me with him over to the "Minahassa", as the Dutch call the northern extremity of that island. Everywhere that I had journeyed in the archipelago, I had heard this particular region always spoken of as probably the most beautiful part of all the Dutch possessions in the Orient, and therefore the one land I should not fail to visit. I appreciated the rare opportunity and accepted the captain's invitation with many thanks. I had been on the island of Ternate only four days but had already experienced four earthquakes. Indeed, the mountain seemed to be preparing for another grand eruption, and I was not loath to leave its shores. So great is the danger that its inhabitants constantly incur of being entombed alive by night in the ruins of their own dwellings, that each of the foreigners of the town has a small sleeping-house in the rear of the one built of stone, which is occupied by day. The walls of this sleeping-house are always made of gaba-gaba, the dried midribs of palm-leaves, which, when placed on

and, will support a considerable weight, and yet are almost as light as cork. The roof is made of atap, a thatch of dry palm-leaves, and the whole structure is, therefore, so light that no one would be seriously injured if it should fall upon its sleeping occupants.

December 12th, 1865. As we came out from our anchorage into the Mollucca Passage, our course was changed to the west and at last my face was turned homeward, a thought sufficient to give a deep thrill of joy to one whose journeyings alone had already lasted nearly a year and a half and half encircled the globe. The officers of the ship entertained me with their experience in trying to waylay and destroy the pirates that still infest these seas. They come down here in the middle of the western monsoon, that is January and February, and return in the beginning of the eastern Monsoon, in order to have a fair wind both ways, and to be here during the calms which prevail in the changing of the monsoons, when the large numbers of their oars, enables them to attack the sailing ships on which they prey, and which, entirely unable to escape, have too often fallen helplessly into the hands of their murderers. Last year the man-of-war, then on this station had the good fortune to supprise a fleet of five boats, one of them carrying as many as sixty men. At first they attempted to escape by means of their many oars, but her shot and shell soon began to tear their craft to pieces. Then they pulled in toward the land and jumped overboard, but by this time the Malays of the villages on the shore had all turned out with their spears, the only weapons they had, and they continued to scour the woods for these marauders, until, as far as could be ascertained, not one of them was left alive. Now, they seldom attack a European vessel, but when they do and succeed, they take revenge for the severe punishment meted out to them by the Dutch war-ships, and not one white man is

over left to tell the tale of capture and massacre. The vessels they prey on chiefly are the prahus commanded by half-castes and manned by Malays, which carry on most of the trade between the Dutch ports on these islands. One of these vessels was captured and destroyed last year, while sailing down this coast from Kema, by these assassins on the high seas. The whites and half-castes are always slain and the Malay crews are kept as slaves. While I was at Kema, two Malays came to the house of the officer with whom I was living, and said that they were natives of a small village on the neighboring bay of Gorontalo; and that, while they were out fishing, they had been captured by a fleet of pirates, who soon after set out on their homeward voyage; and that while the fleet was passing Sangir a small volcanic island between the northern end of Celebes and Mindanao, they succeeded in escaping by jumping overboard and swimming some miles to the shore. They had then reached Kema, on their return voyage and they came to the controleur to apply for food and clothing and free transportation to their homes. Such cases are always generously provided for by the Dutch Government, and their request was immediately granted. A few years ago these pirates were so bold as to send a challenge to the Dutch fleet at Batavia to come and meet them in the Strait of Macassar, and several officers assured me that five war ships were actually sent. When they arrived there, no pirates could be seen, but to this day all believe the challenge was a <u>bona fide</u> one, and that the only reason that the pirates were not ready to carry out their part of the congest was because more men-of-war appeared than they had anticipated. A short time after I arrived back at Batavia, a fleet of these sea-rovers was destroyed in that very strait. One chief, who was taken on the opposite coast of Borneo five years ago, acknowledged that he had previously commanded two

plundering expeditions to the Macassar Strait, and that, though the Dutch navy had destroyed his fleet both times, he had been able to escape by swimming to the shore. At Kema I saw one of the five prahus that were captured in that vicinity last year. It was an open boat about fifty feet long, twelve broad and four deep.. There were places for five oars on each side. At the bow and stern was a kind of deck or platform, and in the middle of each of them, a small vertical post, on which was originally placed a long swivel throwing a ball weighing one pound. They do not, however, depend on these small cannon, but always try to get alongside a vessel as soon as possible, and then board her at the same moment on all sides in overpowering numbers. It is almost impossible to catch them unless it is done by surprise, and this they carefully avoid by means of spies on the shore. Our captain informed me that several times when he had suddenly appeared on some part of the adjacent coasts, fires were instantly lighted on the tops of the neighboring hills, evidently as signals to pirates in the vicinity. As soon as they receive this warning, they hide away in the creeks and bays among the mangrove-trees, so that a war-vessel might steam past them again and again without discovering the slightest indication of where they are concealed. To the Dutch almost exclusively belongs the honor of having rendered the navigation of these straits so comparatively safe as it is now. The English have assisted in the western part of the archipelago, but the Spaniards, from whose territory these marauders now come, have effected little toward removing this pest from the Philippines, where it is still as rife as it was two hundred years ago."

The foregoing account of piracy in these seas has been taken from my "Travels in the East Indian Archipelago", and describes the conditions which I found to prevail there in December 1865.

As a consequence of the annihilation of the Spanish fleet by Admiral Dewey in Manila Bay on the first day of March 1898, and in accordance with the treaty signed in Paris on the 10th of the following December, the Philippine Islands became a part of the territory of the United States, and an opportunity has been thus afforded us to obtain more exact information regarding these natives of that archipelago, who were constantly making raids upon the peoples of the Dutch possessions at the time of my travels in that part of the Orient. Piracy and a constant warfare between the natives of the various islands in these seas appear on the first page of recorded history. Magellan's death occurred at Mactan on the 27th of April 1521, because he had espoused the cause of his new allies, the natives of Cebu.

Celebes.

The harbor used in these islands depends upon the direction of the wind. At this time of the year, in December, the western monsoon is prevailing, and the port for the northern peninsular of Celebes is on the eastern side at Kema on the Moluccs Passage or Strait, but during the eastern monsoon, steamers and ships go around the northern extremity of Celebes to Manado on the Strait of Macassar.

The distance from Kema to Menado, the capital of the Minahassa, is about twenty miles and I visited that place first, because I desired letters from the Resident to the officials up in the interior plateau, so widely and worthily famous for its remarkable beauty.

Though the road is made only for native carts and officials traveling on horseback, we found it for nearly all the way lined with large shade-trees, which in several places for long distances, met overhead so as to form a continuous covered way, thus affording to those who travel this route an admirable shelter from the hot sunshine

and heavy showers. Among the trees were many crows. Corvus enka, not shy, as they always are in our country, but so tame that I frequently rode within ten yards of where they were sitting without causing them to move. Numbers of a bright-yellow bird, about as large as a robin, were seen among the branches; and on the ground another somewhat larger than a blackbird, Di crurus, with a long, lyre-shaped tail and a plumage of shining blue-black. These birds rarely or never hear the report of a gun, and therefore, have not learned to regard man as a universal destroyer, and their tameness is perfectly charming. Even the black crow becomes an attractive bird, in spite of its hoarse caw, when you are surprised to find that he no longer shuns your companionship, but distinctly makes all the overtures he can to be social. The road runs along the southern flanks of Mount Klabat. On my left hand was a deep valley, and fine enery was occasionally revealed through the foliage that covered the roadway. Northward was a dense forest of large trees, and this is the restricted habitat of one of the rarest Mammals living in the whole archipelago. It is the peculiar antelope, Anoa depressicornis H. Smith. In these same unbroken forests the babirusa, Babirusa ALFurus, Less., is found in large numbers; by this roadside I saw for the first time the plant growing, from which the "Manila hemp" is manufactured. It is a species of banana, Musa textilis, and grows to a height of twelve or fifteen feet. It appears to be indigenous and can be raised here from the seed. The fibres are taken from the large, succulent leaves. Though it resembles the banana so closely that at first most people would mistake it for that plant, yet its uit is small and disagreeable to the taste, and not edible.

The Resident's house at Manado is surrounded by large gardens abounding in the choicest of tropical plants. A walk of three miles

from this beautiful place around the northern side of the bay, brought us to Tenumpa, where all the lepers of this residency are obliged to live by themselves, banished forever from all communication with other natives, except such of their friends as may visit them from time to time. The little hamlet consists of twelve small houses, regularly arranged on either side of a street. They were all neatly whitewashed, and each has a small plot of ground, where its unfortunate occupants can keep themselves busy, and partly forget their incurable sufferings, and their life-long banishment. A native who lives near by has charge of them, and my examination convinced me that they were well cared for by the Dutch government. As we passed from house to house, the officer called them out and I gave each of them a small piece of silver, for which they appeared very grateful. There are now nineteen natives here afflicted with this loathsome malady. The part of the body, which appears to be the first to be attacked, is the nose, the next is the hands, and the last part are the feet, though in some cases, it only appears in one of these organs. In one individual the nose had wholly disappeared, and even the partition between the nostrils, so that I could look directly into the chamber over the mouth. In another case, the nose and all of the upper lip were gone, and even the outer part of the upper jaw, so that the front teeth only stuck fast on one side and were completely exposed to view throughout their entire length. These, however, were the older cases, in which the disease had made greater progress. Many had lost their fingers and toes. One little girl had her ankles and feet so swollen that her ankle-bones could not be distinguished, and yet I could not but notice how cheerful she appeared. Two men had the disease in their feet, which had swollen until they were

three times their proper size, and all broken upon and deeply fissured in the most shocking manner. No one who has not seen such lepers as these can have any idea of what fearful forms human flesh can assume, and life still continue in the body. Suffering from such an incurable, loathsome malady, is literally a "living death". I found it so sickening, even to look at them, that I was glad when I came to the last house. Here I was shown a young child, a few weeks old. No marks of the disease could be detected, unless it might be that it was very much lighter in color than either of its parents. The father was one of the worst cases I saw, but the disease had not appeared in the mother, except as a great swelling in the ankles. This child must certainly die a leper, and probably will never leave that village where it was born. For this reason, if for no other the government certainly acts wisely in compelling all who have this dread disease to come and live here together, where, at all events, it cannot be widely spread. When it does appear in a very malignant form in the parents, it has been known to fail to appear in the children, but to be manifest again in the grandchildren. This disease is regarded here as an endemic, that is, chiefly confined to the Minahassa and the Moluccas. Much discussion has arisen whether leprosy is contagious. The doctor, with whom I resided at Buru, had been previously stationed at Amboina, and while there knew of a soldier, who was a Hollander, and yet he was taken with leprosy and died of it.

From the shore near Temumpa we had a delightful view over the bay of Menado. The sea was as smooth as glass, and scarcely a ripple broke on the sandy beach, which was shaded by graceful, overhanging palms. Before me to the south rose the high mountains, which form

the great buttresses to the plateau of the Minahassa, which they enclose. Their dense forests of bright green are unbroken from the sea shore to the summit of the highest peaks.

At Menado the Resident showed me the large wooden store-houses where the coffee is received from the interior, and kept for transportation to market. As we entered the buildings, I was surprised at the rich aromatic fragrance that filled the air. It differed much more from that given out by the coffee seen in our land than any one will readily believe. Here it is stored in bags, just as it comes in from the plantations. In order that I might realise what superior coffee the Minahassa produces, the Resident had several bags opened. I found the kernels, instead of being opaque and, as we usually see them, having a tinge of bronze, were translucent and of a greenish-blue color, and very hard. This coffee commands a much higher price than that of Java, and is superior to any raised in the whole archipelago, unless it may be some that comes from the interior of Sumatra. The coffee crop is subject to some variation, but the Resident informs me that the average yield of the government gardens during the last few years has been no less than 37,000 piculs (5,000,000 pounds). The whole number of trees belonging to the government is now (1865) 5,949,616, but a large proportion of these are young, and therefore bear little or no fruit. Several private individuals also own large plantations, that yield as well in proportion to the number of trees they contain. The trees are found to thrive best above an elevation of one thousand feet above the sea. The tree, Coffea Arabica, is a native of Africa, between the tenth and fifteenth degrees of north latitude, but it thrives anywhere within the tropics on the hundreds of islands in this archipelago, as well as it does in the drier lands

where it is indigenous. It was as late as 1450, about half a century before the discovery of our continent, that it was brought over from Abyssinia to the mountainous parts of Arabia. In this way it happened that the Arabians were the people who introduced it into Europe. In 1690, forty years after the people of Europe had learned to appreciate it as a beverage, the Dutch Governor General at Batavia had some seeds brought to him from ports in the Arabian Gulf. These flourished so well and bore so much fruit, that the culture of coffee soon spread throughout the archipelago. One of the first plants raised at Batavia was sent to the head of the East India Company in Holland, where it arrived safely and bore fruit, and some of these seeds were sent to Surinam, where they also flourished and in 1718 coffee began to be exported from that locality to various parts of the West Indies and the shores of the Gulf of Mexico.

December 28th, 1865. At 6 A.M. bade the Resident good-bye, and started for the highlands of the Minahassa with an official servant as a guide and attendant. It was a lovely morning. The cuckoos were pouring out their early songs, and the gurgling of the brook by the wayside was almost the only other sound that broke the stillness of the cool air. A few cirri were floating high in the sky, and also far below them a number of cumuli, whose sharply defined and perpendicular sides reflected the bright sunlight like pearly, opaque crystals of the size of mountains. Our road was, like all in the Minahassa, broad and well graded, and where it ascended an acclivity, coarse fibres from the leaves of the gomuti palm were laid across it in order to cause the water to drain off into the ditches by its sides. When the road came to a village it always divided, so that all the carts may go round the village and not through it. This arrangement enables the natives to keep the main street through their villages neat and smooth. Such streets usually consist of a narrow road,

bordered on either side by a band of green turf, and outside of these are sidewalks of naked soil like the roadway. Six miles out from Menado the road began to rapidly ascend by a series of zigzags up the sides of Mount Empung, which forms one of the exterior buttresses of the plateau situated to the south and east. Nine paals from the Resident's house, when we were about twelve hundred feet above the sea, I turned round my horse to the north and enjoyed the magnificent view over the bay of Menado and the adjacent shore. Out in the bay rose several high islands, including the volcanic peak of Menado Tua, or "Old Menado", its feet bathed in the blue sea and its head raised high in the blue sky.. Immediately beneath me, the land was very low near the shore and abounded in many species of palms. Farther inland it soon began to rise and sweep upward toward the high summit of Mount Klabat in majestic curves. The beautiful cirri, which we had noticed in the early morning now began to change into rain-clouds and roll down the mountain, and soon the charming landscape beneath us was entirely hidden from our view. (The road here passes through deep cuts, that show well the various kinds of rocks, which are trachytic sands, pumice-stone, and a conglomerate of those materials.) As we ascended higher, we passed many placed on the mountain-side, where the natives were cultivating maize, and from far above us and beneath us came the echoing and reechoing songs of those, who were busy cultivating this exotic but most useful plant. The custom of these people here to sing while working in the field is the more noticeable, because the Javanese and other branches of the Malay race usually toil on without ever thinking of thus lightening their monotonous labor.

In the charming village of Sarongsong, at the centre of the

settlement and on one side of the main street is the chief's house, and opposite to it, but placed back from the road, is the rumah negri or dwelling-place of the Dutch official, when he is making a tour of inspection; and as I carried a special letter from the Governor General, I was regarded as a guest of the government and was welcome to occupy rooms in such rest-houses, whenever and wherever I pleased. Between these two principal houses of the town was an open, narrow park, which was a pretty garden abounding in roses. At the neighboring village of Sonder, the rumah negri, which was placed at my disposal, is said to be a far better structure than any rest-house even in Java. It stands at the end of a long, beautifully-shaded avenue. The approach is bordered with a narrow band of grass, neatly clipped and the sidewalks are covered with a white earth, which was brought from a distance. A fine grove surrounds the house, and here are many cassowary-trees, the long, needle-like leaves of which closely resemble the downy plumage of that strange bird. This evening, as the full moon shines through the graceful foliage, the whole grove is transformed into a place of tropical enchantment.

The next day we came to the beautiful village of Tompasso, which islaid out with a large, square pond in the center, and on a broad dike which crosses it, is the highway. A well-graded street borders this pond and the houses on its four sides are all placed facing its central point. The rich hedges, which border the house-lots are mostly composed of rose-bushes, and the pond itself is nearly filled with the richly-colored and fragrant lotus, Nymphoea Lotus, a large water-lily, held sacred in Egypt and India as the symbol of creation. This is the beautiful flower upon which Buddha is represented as sitting in each of the great images, where he is supposed to personify

the Past, the Present and the Future, three immense statues, to be seen in many of the thousand temples, which in China and Japan are dedicated to the worship of that great heathen idol of a religion, which originated in India. The lotus of northern Africa, which bears the fruit that was supposed to possess the wonderful power of making all, who tasted it, forget their "homes and friends and native shores" is the Celtis Australis. If the ancients, who delighted so greatly in myths and fables, had only known of this wonderfully charming region, they would have located their lotus-land here in the distant Orient, where the air is so cool, and pure, and all the scenery is such a picture of peace and plenty.

The puma negri at the southern end of Lake Tondano is one of the most pleasantly located buildings in the Minahassa. It is large and carefully built and has broad verandahs both toward the lake and the village. It is surrounded by green grass, which is neatly bordered with gravelled walks and rose-bushes, now covered with large crimson flowers. In the evening, when the moon rose over the sharp peaks near by and spread a broad band of silver light over the lake, the effect was peculiarly charming, and as we inhaled the balmy air and recalled to mind the ponds of beautiful lotus in the villages through which we had been passing, we almost believed that we had arrived in that enchanted lotus-land, which Tennyson thus pictures:

"In the afternoon they came unto a land
In which it seemed always afternoon;
At noon the coast with languid air did swoon,
Breathing like one that hath a weary dream.
Full-faced above the valley stood the moon;
And like a downward smoke the slender stream
Along the cliff to fall, and pause, and fall, did seem."

January 1, 1866. A large boat, manned by seven natives, was made ready for me to go to any part of Lake Tondano, and ascertain its depths. It occupied the lower portion of a high plateau, and its

surface is stated by DeLange to be two thousand two hundred and seventy-two English feet above the sea. It is about seventeen miles long in a northerly and southerly direction, and varies in width from two to seven miles. It is nearly divided into equal parts by high capes that project from either shore. On the south and southwest and on the north, its shores are low, and the land slowly ascends from one to five miles, and then curves upwards to the jagged mountain-crest that bounds the horizon on all sides. In the other parts of its shores, its borders rise up from the water in steep acclivities. All the lowlands and the lower flanks of the mountains are under a high state of cultivation, and the air is cool and pure, while it is excessively hot and sultry on the ocean shore below. Some writers have regarded this lake-basin as an old extinct crater; and some, as only a depression in the surrounding plain. To settle this question beyond a doubt, it was necessary to make a series of soundings. I therefore, when at Menado, asked the Resident if he could furnish me with a line to test the depth of the lake as I crossed it on my route. He replied that he had one of only two hundred fathoms and that of course I could not expect to reach the bottom with such a short line for all the fishermen, who live on the shores of the lake stoutly declare that it has "no bottom", that is, is unfathomable. As it would mark some progress to know that it was more than twelve hundred feet deep, a coolie was ordered to accompany me and carry the line. From Kakas we rowed a short distance toward the high shore opposite, that being reported to be one of the unmeasurable places. A heavy sinker was put on, and the whole line cleared, so that it would run out freely to the last foot. I gave the man at the bow the command to "let go" and the cord began to rattle over the boat's side, when

suddenly it stopped short. "Is the sinker off? No! the weight is on the bottom!" "How many fathoms are out?" "Eleven fathoms and five feet, Sir." The water was only seventy-one feet deep. After this experience, we sounded eight times, and the deepest place we found, which was near the middle and between the two capes, was only seventy-four feet. The lake merely fills a gentle depression in the plateau.

During the following night the thick rain-clouds passed away, and the morning sun rose in a clear sky. The controleur provided me with a horse, and a native official, the hukom tua, literally "The old man of the village", accompanied me as a guide. Our course was nearly west, and soon the road, as we ascended from the lake, became very steep and extremely slippery from the recent rain. As we rose, the view over the plateau beneath us kept widening, until we wound round the mountain to the little village of Rurukan, the highest native settlement in this land. The chief of this village guided us to the top of a neighboring peak, where I found nearly all the Minahassa spread out before me like a map. From the point where I stood, there stretched to the south a high mountain-chain, forming the western border of the plateau of Tondano. A little more to the east were seen the lake far below and the level lands along a part of its shores, while on the opposite side of the lake rose the mountains that form the other end of the range on which I was standing. This chain curves like a horseshoe, the open part being turned toward the north. At this same point where nearly all the details of the plateau were comprised in a single view, by turning a little toward the north, I could look down the outer flanks of this elevated region away to the low, distant ocean-shore, where the dark blue sea was breaking into white surf in the sparkling sunshine. A little further toward the north rose the lofty peak of Mount Klabat, covered with a

thick mantle of white fleecy clouds, which had the hue of ermine in the bright light. This mantle was slowly raised and lowered by the invisible hand of the strong west wind. Beneath it, low on the sides of the mountain, was seen a line of trees, marking the shaded road I had taken on my way from Kema to Menado. This is considered, and I believe rightly, the very finest view in the whole archipelago, and one of the most charming in the world, because other famous views, like that of Damascus, do not include that great emblem of infinity, the wide ocean.

The Minahassa did, indeed, prove to be more wonderfully beautiful than I had anticipated from all the enthusiastic descriptions I had been hearing of it, ever since I sailed from Batavia through these Oriental seas.

The steamer Menado, on which I had previously taken passage from Batavia all the way to Amboina, now arrived at Kema. She had brought my collections from Amboina, Buru and Ternate and I was ready to return to Java, for some months had passed since I had accomplished the immediate object of my voyage from Boston to the Spice Islands, and during that time I had traveled many hundred miles and had reached several regions, which I had not dared to expect to see, even when I sailed from Batavia. A whale-ship from New Bedford was also in the road, and when I visited her and heard every one, even the cabin-boy, speaking English, it seemed almost as strange as it did to hear nothing but Malay and Dutch when I first arrived in Java.

January 10, 1866. At noon we steamed out of the bay of Kema and down the eastern and southern coasts of Celebes for Macassar. As the sun was setting we were just off the headland, which forms the northern limit of the bay of Gorontalo, and as the sun sank behind the end

of this promontory, its jagged outline was tined with a broad margin of gold. Bands of strati stretched across the sky from north to south and successively changed from gold to a bright crimson, and then to a deep, dark red as the sunlight faded. All this bright coloring was repeated on the surface of the calm sea, and the air between assumed a rich, scintillating appearance as if filled with millions of minute crystals of gold.

All the following night and the next day, the sea was almost as smooth as glass, while we knew that on the opposite or western side of Celebes there has been, at this time of the year, one continuous storm, and that is why we steamed down the lee or eastern side of the islands. Here the seasons on the east and west coasts alternate, as we have already noticed is the case of the two monsoons in Ceram and Buru, though those islands extend east and west, while Celebes stretches north and south. At sunset on that day we were approaching the Buton passage, which separates the large island of Buton from Wangi-wangi, the "Sweet-scented islands" This is the great highway for sailing ships bound from Singapore and Sunda Strait to China during the western monsoon, and several are now here, drifting over the calm sea.

January 13, 1866. This morning we passed near a large American man-of-war coming down grandly from the west under auxiliary steam and with a full press of canvas. It was most agreeable and unexpected pleasure to see such a splendid representative of our own navy in these remote seas. As I wrote the above lines, I little imagined that this fine ship was the Hartford, made famous by Admiral Farragut's brave and successful assault on the forts below Mobile, and that Rear Admiral, H. H. Bell, then commanding our Asiatic squadron, was on board; and that during that same year, 1866, it would be my privilege

to meet him and receive from him and the other officers of our United States navy, so much kind assistance in making long voyages on the coasts of China, Corea and Japan.

As we steamed out of Macassar for Java, our large ship was little else than a great floating menagerie. We had, as usual, many native soldiers on board, moving from one military station to another, and each had with him besides his family, two or three pet parrots or cockatoos. Several of our passengers also, had dozens of large cages, containing crested pigeons from NewGuinea, and representatives of nearly every species of parrot found in the eastern part of the Archipelago. We also had more than a dozen kinds of odd-looking monkeys, two or three of which were continually getting loose and upsetting the parrot cages, and before the sluggish Malays could approach them with a "rope's end", they would swing themselves up the shrouds, and escape the punishment which they knew their mischief well deserved. These birds and monkeys had been mostly purchased in the Spice Islands, and if all on board could have been transported to New York or London, they would have excelled by far the collections on exhibition in both of the Zoological Gardens of the American emporium and those of the British metropolis.

On the first day of February, 1866, I arrived back at Batavia, having been absent eight months on my voyage to the Spice Islands. Through the courtesy of Messrs. Dummler & Co., who offered to store my collections and forward them to America, I found myself again entirely free to commence a new journey.

The generous offer of the Governor General, to give me post-horses free over all parts of Java, was duly considered; but, as many naturalists and travelers have described that rich island already,

I concluded to proceed to Sumatra and, if possible, journey in the interior of that island, then almost unexplored; and, accordingly, on the 12th of February, I took passage for Padang, the capital of the West Coast of Sumatra, and again it was my fortune to find myself on board the good ship Menado, the same steamer on which I had already enjoyed long voyages in those eastern seas. As we entered the Strait of Sunda I looked back for the last time on the beautifully cultivated shores of Java.

It may be thus compared with Cuba, the largest and richest island of our West Indies:

Java, length 622 miles; area, 48,360 Sq.M. population in 1900, 28,745,698

Cuba, length 730 miles; area, 44,000 Sq.M. population in 1899, 1,572,729.

The growth of the population in Java has been most astonishing and is by far the most important change that has occurred in the archipelago from the time of my travels in 1865 and 1866 up to the present time, 1908. In 1755, after fifteen years of civil war, the total number of people in Java and Madura was stated to be only 2,001,911. When I was there the official figure given me was 13,917,368, but in the "Census of the Philippine Islands" made by General Sanger for our government and published in 1905, a full statement is made in volume 1, page 78, announcing that, at the beginning of the present century, Java's population had reached the surprising total, above given, of nearly twenty-nine millions. This official document further adds: "The total number of Malay's is somewhere in the neighborhood of 40,000,000, of which over 28,000,000 or three-fourths of the whole race, are found in Java, most of the remainder being in the Philippine Islands." These simple figures form the most impressive statement that can be given of the unparalleled

success of the paternal character of the Dutch government, which while kind and considerate in a marked degree, is still strong enough and firm enough to put down rebellions and all interneoine strife and to steadily encourage every form of industry and especially that of agriculture. Apparently the only other important changes in the archipelago since my travels there in 1865 is the great extension of the railroads in Java, which were connected together into a regular system in 1895; and the lengthening of the routes for the steamships that carry the mail and keep up regular communication with the remote islands east of Amboina. At the time of my visit, the only railroad in the Dutch possessions had just been begun at Samarong and was planned to extend southward to Surakarta and Jokjokarta, which are located in the central part of the island, in what is properly known as "the garden of Java". A railroad has since been built, which commences at Tanjong Priok, a new harbor, at a headland a few miles east of the former, shallow roadstead off the city of Batavia. It brings the passengers, the mails and most of the freight to the "Lower Town", or business part of the city. Continuing southward to Bristenzorg, the residence of the Governor General and the location of the famous Botanic Garden, it turns eastward, and passing through the rich interior lands, connects with the branch to Samarang and continues on to Surabaya, whence other branches reach the region south and east of that city. Small steam tramways also now spread out over the fertile areas in the vicinity of the larger cities, as they do in Holland in the suburbs of Amsterdam. In 1900 there were in Java 1100 miles of railway and 414 miles of tramway. A line is now in process of construction from Batavia to Anjer on the Strait of Sunda.

Islands; and from Amboina and Ternate to Humboldt's Bay on the north shore of New Guinea. Other lines connect Batavia and Surabaya with ports on the southern and eastern shores of Borneo, while by the main lines to Singapore, constant communication is maintained with China, India and Europe. The Dutch Steam Navigation Company has, at the present time, thirty-one steamers running between various parts of the archipelago.

Our course for Padang, through the Strait of Sunda, took us close to the shores of Krakatoa, the volcano which has since become famous throughout the world for having experienced the greatest eruption in all the recorded history of our planet. The following brief account of its stupendous explosion, I have compiled chiefly from an article by Sir Archibald Geikie in the Encyclopaedia Brittanica and from Dana's Geology, where an admirable description is also given of the great volcanoes of the Hawaiian Islands, the largest on our globe, which I visited and studied in 1899.

At some unknown early period there was a great volcano in the centre of the area where now is this Strait between Java and Sumatra; and long before any European had sailed in these seas, a gigantic explosion took place, by which the whole mountain was so completely blown away, that only the outer portions of its base were left in the form of a ring of little islands. Afterwards, weaker eruptions gradually built up a new series of small cones within the great crater ring. The largest of these rose to a height of 2,623 feet above the sea and formed the volcanic island of Krakatoa. It had been perfectly quiet for over two hundred years and was so small compared with the great volcanoes on the neighboring shores of Java and Sumatra, that as we passed it we hardly gave it any attention, except to note the splendid forests on its flanks. It is said, that in the year

1680 it suffered an eruption and at that time great earthquakes occurred in the vicinity and large quantities of pumice-stone were ejected from this mountain; but the effects of this explosion had been so concealed by the subsequent spread of tropical vegetation that it was a question, whether any such eruption had ever occurred. About the year 1877, earthquakes began to be frequent in the Strait and continued for several years, thus giving a warning that the volcanic energy, which had been sleeping so long was waking up to new life. In May 1883, Krakatoa again broke out in eruption. For a time it only belched out pumice-stone and fine dust, accompanied with detonations, tremors and earthquakes. At last on the 26th of August, a succession of paroxysmal explosions began, which continued until the morning of the 28th when they ceased as suddenly as they had begun. The four most violent explosions occurred on the 27th. The whole of the northern and lower portion of the island of Krakatoa, lying within the original crater ring of prehistoric time, was blown away, and instead of the island that had previously existed, there was left only a submarine cavity, which at places, was more than 1,000 feet deep, below the level of the sea. This "explosive" eruption was probably caused by the cool sea-water gaining access to the column of hot lava which filled the pipe of the volcano. At Batavia, 100 miles from Krakatoa, the sky was so darkened by the ashes that lamps had to be lighted at mid-day, and this cloud of darkness extended to Bandong, a distance of 150 miles. It has been calculated that the column of stone, dust and ashes, which was projected into the sky, rose to the unprecedented height of seventeen miles or more. The finer dust, which rose highest, was carried along from the east toward the west at a rate of about seventy-three miles an hour; until, within a period of six

weeks, it was diffused over nearly the whole space on our globe between the latitudes of 30°N. and 45°S. This mass of floating material caused the marvellously beautifully sunset glows that were seen around the world the following year. It spread from the north of Scandanavia to the Cape of Good Hope.

But the most stupendous volcanic event, as Geikie states, was the world-wide disturbance of the atmosphere. The culminating paroxysm of Krakatoa, on the morning of the 27th of August, gave rise to an atmospheric wave, which travelling eastwards from the volcano as a centre, became a great circle at 180° from its point of origin, whence it continued travelling onwards and contracting till it reached a node at the antipodes to Krakatoa. It was then reflected backwards to the volcano, whence it once more returned in its original direction; and according to Sir R. Struchey "in this manner its repetition was observed not fewer than seven times at many stations - four passages having been those of the wave traveling from Krakatoa, and three were those of the wave travelling from its antipodes." This point is southeast of Panama, in the state of Columbia, north of Bogota in the valley of the Magdelena River, and near the town of Zapatoda, Long. 74°W. and Lat. 6°, 30°N.

The sounds of the explosions were heard at Rodriguez, 3,000 English miles away across the Indian Ocean; also at Bangkok in Siam, 1,413 miles; in the Philippine Islands, about 1,450 miles; in Ceylon, 2,058 miles; and in South Australia about 2,250 miles. These distances are greater than for any sounds, which have ever been heard by man. Equally remarkable were the waves caused by the ocean. One set of an hour apart, reached Cape Horn, a distance of 7,818 geographical miles, and probably the British Channel, 11,040 miles. The wave rolling across the Strait of Sunda attained at Anjer on Java a height

of seventy or eighty feet and overwhelmed there and on the adjoining shores no less than 36,000 souls.

The city of Padang is situated on a small plain, whence its name: padang in Malay, meaning an open field or plain. Near the centre of the town is a large, beautiful lawn, on one side of which is the residence of the Governor. Having taken quarters at one of the hotels, I put on a dress suit, which was always expected of me on my first and official visit; and in the early morning called on Governor Van den Bosche, who received me most cordially and proposed that I immediately become his guest and make his house my home as long as I pleased to stay at his capital. "Besides," he added, "I have eight good carriage-horses in the stable, and I have so much writing to do that they are spoiling for want of exercise; now if you will come, you can ride whenever you please". He also said that I had come to Sumatra at an opportune time, for the "inspector of posts" had recently arrived from Java and would make an overland journey to Siboga, their most northern port, and that he had offered to the inspector his "American". a light four-wheeled carriage made in Boston, and as it would accommodate two persons I could make this new and pioneer journey in comfort. The carriage would take me along up onto the interior plateau, a distance of sixty miles and from there we would ride together over a bridle path that would lead us up and down mountains and along the edges of precipices for one hundred and ninety miles. From the low coast lands the way to the "Padang Highlands" leads up through a canon, or break in the high mountain chain, which is called the Kloof i.e. "the Cleft". Into this chasm a stream fell over a precipice about seventy five feet high down to the level of the roadway below. Where the water curved over the edge of the high cliff it was confined, but as soon as it

began to fall, it spread out and came down, not in one continuous, monotonous sheet, but in a series of wavelets, so that the whole effect was as if it were a huge comet trying to escape from the earth upward to its proper place in the clear blue sky above it. On either side of this white falling water was a curtain of green vegetation which had gained a foothold in every crevice and upon every projecting ledge, and hung down like a piece of the richest oriental tapestry. The cleft has not been formed in a straight but in a zigzag line, so that, in looking up or down, its sides seem to meet at a short distance before you and prevent any escape in either direction; but, as you proceed, the road suddenly opens to the right or left, and thus the effect is never wearying. For four miles I rode up this chasm, and at last came out to the edge of the interior plateau at the village of Padang Panjang. I was then more than two thousand four hundred feet above the coastal plain, having ascended two thousand feet in four miles. At this height the average temperature was 49.28° Fahrenheit, and I seemed to have passed from a tropical up into a temperate climate. In all the villages I have passed through today, both on the low land and here on the plateau, there is a passar, or market building and where they have been erected by the natives, they are the most remarkable buildings which I have seen in the archipelago. They are perched upon posts like the dwelling houses. The ridge-pole, instead of being horizontal, curves up so high at each end, that the roof takes on the form of a crescent with the horns pointing upward. Sometimes a shorter roof is placed in the middle of the longer and then the two look like a small crescent within a large one.

The dress of the men here on the plateau is not very different from that of the Malays of Java, but the costume of the women is

remarkable. On the head is worn a long scarf, wound like a turban, one end being allowed to hang down, sometimes over the forehead, and sometimes on one side or on the back of the head. The upper part of the body is clothed in a baju of the common pattern and passing over one shoulder, diagonally across the breast, and under the opposite arm is a long, bright colored scarf. The ends of this as well as that worn on the head are ornamented with imitations of leaves and fruit, very tastefully wrought with gold thread. At the waist is fastened the sarong, which is not sewn up at the ends as in other parts of the archipelago. It is therefore nothing but a piece of calico, about a yard long, wound round the body, and the two ends gathered on the right hip where they are twisted together, and tucked under so as to form a rude knot. As the sarong is thus open on the right side, it is slightly thrown apart, higher than the knee at every step, like the statues of the goddess Diana in hunting-costume. Their most remarkable custom, however, is distending the lobe of the ear. When young, an incision is made, and a stiff leaf is rolled up and thrust into it, in such a way that the tendency of the leaf to unroll will stretch the incision. When one leaf has lost its elasticity it is exchanged for another, and, in this way the opening increases until it is an inch in diameter. A saucer-shaped ornament, with a groove on the outer side of its rim, is then put into the ear, exactly as a stud is inserted into a gentleman's shirt-bosom. It is generally made of gold, and the central part consists of very fine open-work, so that it is very light, yet the opening in the ear sometimes to widen until it is frequently an inch and a half in diameter and occasionally nearly large enough for the wearer to pass one of her hands through. The front part of the loop is then only attached to the head by a round bundle of muscles, smaller than a pipe-stem,

and that individual is then obliged to lay aside her ornaments or have the lower part of her ears changed into long, dangling strings. When these ornaments are taken out, and the lobes of their ears are seen to be nothing but long loops, their appearance becomes extremely repulsive. The men are never guilty of this loathsome practice. A similar habit is represented in all the Chinese and Japanese images of Buddha.

At Fort de Kock, the Resident furnished me with a fine saddle-horse and an attendant that I might branch off from the main route and visit the lake of Manindyu. As we neared the end of this journey the roadway slowly ascended, until we found ourselves on the rim of a crater of most enormous dimensions. The height of the edge of the crater where we began to descend is thirty-six hundred feet and that of the lake fifteen hundred and forty above the sea; so that we zig-zagged down a steep bridle-path for over two thousand feet. During the day heavy clouds had filled the crater, but at sunset they rose slowly upward, but not so high at first as to allow us to see the tops of the peaks in the western side of the crater-wall. The bright sunlight therefore shone in through the triangular openings between the lower surface of the level clouds and the bottoms of the steeply-sided valleys; and these oblique bands of golden sunshine fell on the water at some distance from the opposite shore, and then came shimmering over the surface of the lake and then brightly illumined the front of the controleur's house, where we sat watching this unique and magnificent view. The whole cavity is not circular but composed of two craters of unequal diameter, the larger being three geographical miles across and the smaller two and a quarter miles and the length of the whole lake being no less than six miles. This gigantic crater, therefore, is as large as the one we have suggested probably

existed in former times in the Banda Islands.

The flanks of the valleys through which we were journeying were occupied with terraces for the culture of rice, and near most of the villages were parks of coffee trees and in the gardens flourishing beds of tobacco plants, this whole interior region between the parallel mountain chains that extend throughout the whole length of the island from the Strait of Sunda to the Bay of Bengal, being famous for the superiority of its coffee and tobacco for export, and for the abundance of its rice for the sustenance of its own people.

Beyond the village of Pisang, the Malay name for the banana, our road lay in a narrow valley, and in the thick tropical forest on either hand, troops of large black monkeys kept up a dismal hooting and trumpeting, their prolonged cries sounding exactly like a score of amateurs practising on trombones. At the house of the controleur nearby, there were more than a dozen monkeys in the garden. Some of them were extremely restless and always swaying to and fro, while others sat still and looked so grave and dignified as to look even more comical than their mischievous companions. There are ten species on this island, none of which are found in Java, while the four species of Java are never seen here, such a definite limit does the Strait of Sunda form to the faunae of these two islands, although it is only fifteen miles wide in some places and islands are nearly midway from either shore. That remarkable ape, the orang-utan, which is the Malay for "The people of the forest", lives in the lowlands at the northern and eastern parts of this island. The governor at Padang had a live one that had been sent to him from that region. She was more than three feet high and very strong. Escaping one time from the box where she was fastened, she climbed a neighboring shade tree and commenced breaking off large limbs and placing them in a fork

of the tree until she had made for herself a resting-place. That, however, not being high enough, she climbed up nearly to the top of the tree and then broke off all the twigs near her, and thus formed a second couch. She did not sway to and fro continually, as many monkeys do, but used to sit quietly, picking off all the foliage within her reach, and then took up another position and demolished the small limbs there in the same manner. It is very singular that this animal is found on Sumatra and Borneo, but is unknown on the Malay Peninsula, which lies almost between them. This interior plateau all the way to the "Kloof" or Cleft, by which I ascended up to it from the low coast lands near Padang, is known as the Menangkabau country, in which according to history the Malays had their original home before they descended to the coast, and becoming a maritime people migrated to the shores of the islands throughout the whole archipelago.

The two principal mountain chains which extend throughout the island are connected together at distances of twenty or thirty miles by high ridges and by transverse chains and we were constantly crossing over these as we journeyed on from one plateau to the next one before us. In these more open parts of the country we found the larger number of the native villages. We had now come into a wilder region and the native officer at Lubu Sike-ping entertained us on venison and said the deer had been shot in his garden, whither it had been pursued by a tiger, for the surrounding forests abound with these ferocious beasts. Near the village of Rau we came into a level plain, where were herds of buffaloes, which are more than half-wild and are said to be very dangerous, but the natives that accompanied us kept up a loud shouting and the herd leaped to the right and left into the jungle and tall grass, and allowed us to pass on

unmolested. The officials here sometimes shoot them, but consider it a most perilous kind of sport, for they say that when a bull is seriously, but not fatally wounded, he will certainly turn and pursue the hunger, and if he can overtake him, will quickly gore him to death.

At Marisipongi, we came to the first village of Battas, who also belong to the Malay race, but have a peculiar alphabet and language of their own. The natives of this valley have recently come under the Dutch government. Until that time they were cannibals like their neighbors of the plateaus of Silindong and Toba which are situated just north of this locality, and are still independent of the rule of the Netherlands India. The rajah of Sipirok assured the governor at Padang that he had eaten human flesh between thirty and forty times, and that never, in all his life, had he tasted anything he relished half as well. This custom has prevailed among this tribe from time immemorial. From Marco Polo's writings we learn that as early at least as 1290, they were addicted to their present revolting custom.

So long as our road, which was only a bridle path, led us over the floor of the valley, it was comparatively safe, but when it ascended to the flanks of a mountain, it became very narrow, and the tall grass completely hid its outer border. Besides, our horse was wholly unaccustomed to a carriage and only half broken, and every few moments took it into his head to stop so suddenly, that we had to hold on to the carriage all the time or at an unexpected moment be in danger of being flung over the fender. The road was now taking us out toward the end of a high spur and the ravine was growing deeper and deeper with an alarming rapidity, and I began to wish myself out of the carriage, but the inspector was unwilling to stop the horse,

for fear we could not get him started again. A Malay was guiding our wild steed by the bit, and away we were dashing at a full gallop, when suddenly, as we rounded the end of the mountain, our road, which was cut in the rock, became so narrow that the outside wheels of our carriage were just on its outer edge, and from that verge the rock descended in such a perpendicular precipice that I could look from my seat down fully two hundred feet into the boiling torrent beneath. It was evidently too late to jump then, so I seized hold of the carriage determined not to go off before my companion, the inspector, who realizing at once our great danger, and perceiving that the only thing we could possibly do was to keep the horse running at the top of his speed, shouted loudly to the horse, and, in the same breath threatened to take off the Malay's head if he should slacken his hold on the bridle for an instant. To increase our alarm, some fragments of rock were found to have fallen down into the road, and our forewheel, on the inner side, struck them with such violence that it certainly seemed that at the next moment we should be hurled off the narrow shelf and over the precipice. For two minutes we appeared to hang suspended in the air and then the road widened. I drew a long breath of relief and leaped over the wheel on to the solid ground, before I could fully satisfy myself that, thanks to a kind Providence and the attraction of gravitation I was really safe. The inspector said that he had traveled many thousand miles in Java, in all manners of ways and through all manners of dangers, but was never so frightened before, and that he would not go back that same way in a carriage for ten thousand guilders. This dangerous place the natives call in the Malay language, kabau-jatu, "Where the buffaloes fall". Only a short time before, a native was driving a single buffalo to market along this way, when the animal shied a little and went off headlong

and was dashed to pieces on the rocks below. The people in this wild region do not live in houses gathered together into villages but in huts which are scattered over the mountain-side. They are ten or fifteen feet long and eight or ten wide, and are perched on high poles. The walls are made of bamboo, and the roofs are thatched with straw. The officials here informed me that these natives eat bananas and wild fruits, maize, yams, dogs and monkeys and even snakes, but not rice, and this is the more remarkable, because it is the staple food of all their neighbors and of nearly all the oriental races.

Here we saw many hanging bird's-nests, most ingeniously constructed. They were made of fine grass woven into a mass having the form of a gourd from eight inches to a foot long. The smaller part is attached to the end of a drooping twig, and near the bottom and slightly at one side, is the opening of a tube about an inch and a half in diameter, which rises vertically for four or five inches and then curves over and descends like a syphon. At the end of this syphon the tube is enlarged into a spherical cavity, and there the ingenious bird lays her eggs, safe from snakes and other marauders.

We were now obliged to turn aside from entering into the dangerous land, where cannibalism still prevails, and follow the best path we could find leading down from the mountainous interior to the sea. The stallions, which were supplied usby the rajahs, had never been harnessed to a carriage before, and it was so nearly impossible to manage them, that finally I proposed to the inspector that he authorise me to attempt to make the wild natives who gathered to welcome us, haul our carriage themselves. He replied that such a plan would be perfectly impossible for these people have no respect for any white man except the governor. However, I noticed that they evidently recognized our "American", as the one the governor had used

in traveling that way once before - the only time a carriage had ever been seen on that road - and at once I directed our Malay attendants, who speak their language, to say to them that the governor wished us to take his "American" to Siboga, and every man must help us obey his command. This ruse struck their fancy and their rajah's detailed some twenty men to haul us to the next village. I selected three of the tallest and fleetest and placed them between the thills, and ranged outside to help haul by means of long rattans fastened to the forward axle, while a suitable number were placed behind to hold back by a rattan, when we went down hill. A wild yell, like a war-whoop, was raised and away we dashed down a gradual descent, as if we had been drawn by a rac-ehorse; the road became steeper and steeper and on we flew faster and faster. Those behind had evidently forgotten to do the part assigned them, and had let go of the rattan altogether. Those in front, who were outside the thills, dropped their rattans and leaped off to right and left from fear of rattling wheels behind them, and those inside the thills shouted out all manner of imploringe and execrations against deserting companions. It was the wildest kind of a wild race but we reached the bottom of the hill safely with the three men within the thills, the only ones near us. The others were scattered at intervals all the way down the hill, but were coming on as fast as they could, and all were in the best of temper and were shouting in childish glee, except the three who had to hold up the thills or have us run over them; and they gave their faithless brothers a spirited lecture, but soon all were again taking their proper places and taking us up the opposite side of the valley at a lively place. The inspector was in constant apprehension of some serious mishap, but I found that new mode of traveling so exhilarating that I lost all fear of any danger and thought only that we

might as well be drawn by wild men as wild horses. Just before we arrived at each village, the rajah of that place would meet us with men enough to take us on to the next kampong, and sometimes we had forty or fifty of them attached to our carriage at the same time. On the level lands they usually took us along on a fast run, shouting and screaming and leaping as if they were half mad. The nearest to this experience, which it has been my privilege as a traveler to enjoy, was riding at a full gallop with three horses abreast over the dreary steppes of Siberia, but that northern journey was very tame compared to the way we dashed through the jungles of Sumatra.

While pursuing our way down the steep declivities from the mountains to the sea, we came to the famous suspension bridge made of rattan, of which I had been hearing alarming descriptions for the previous hundred miles. At once I took off my shoes to avoid slipping and hastened down the airy, oscillating way, without allowing myself to look down and become giddy at the great depth and the roaring torrent beneath. The frail structure was first made by stretching three large rattans over the chasm. On them, narrow strips of boards were placed transversely, and fastened at each end by thin cords of rattan. Other long rattan, starting from the ground at a little distance back of the bank, passed over the branches of high camphor-trees that grew on the verge of the cliff. Descending from these branches in a sharp curve, these main supports rose again steeply to the opposite bank. From the rattans on the sides vertical supports were fastened to the roadway below, exactly as in our suspension bridges, and thus all parts were made to aid in carrying the weight. At each bank the bridge was some eight feet wide, but it narrowed toward the middle until it was only two feet, where it vibrates the most. I had been directed to go over, if possible, at an irregular

hurried walk, and thus break up the oscillating motion, and I was particularly cautioned against seixing hold of the sides of the bridge, lest it might swing in the opposite direction and throw me off into the abyss below. When I had gone half way across the first span, I found that one of the boards on which I was just in the act of placing my foot, had become loosened and had slipped over to one side, so that, if I had taken the next step as I had intended, I should have put my foot through the structure, if indeed I had not fallen headlong and been dashed to death on the rocks that rose through the foaming torrent more than a hundred feet beneath me. I therefore, stopped instantly, and allowed myself to swing to and fro with the flexible bridge until it came to a state of rest, and then went on slowly, and safely reached the tops of the high trees that rose up from an island in the mid stream, and soon I safely reached the farther bank. An official, who had taken careful measurements to prepare a design for a suitable bridge, gave me the following dimensions of the structure I had passed over; whole length, 374 feet; height above the torrent at the middle and lowest part of the first span, 108 feet; height of the middle and lowest part of the second span, 137.5 feet.

The next day by a series of zigzags we came down to Siboga on the shores of Tapanuli Bay. On the way I noticed a high perpendicular cliff composed of recent strata that were horizontal, and which must havd been deposited beneath the ocean, because the opposite side of the valley is open to the sea, with only hills at intervals along its shore, and even their forms indicated that they were of the same sedimentary origin. This impressive cliff is named by the natives, in Malay, Rumą Satan or "The Devil's Dwelling".

The Resident gave orders to the rajah of a village on the banks

of a stream that heads in that dreaded locality, to go with me and protect me and show me the way. This rajah, I found to be a young man and evidently afraid to undertake such an excursion toward the mountains. In the first place, he said, we must be exposed to an attack by the Battas, who were cannibals, but I assured him that this statement only made me more anxious to meet them. After considerable delay he selected the largest man in his kampong and armed him with a long rusty sword. Several other attendants accompanied us as we started on what they all evidently regarded as a perilous journey. Our course was along the rocky bed of the stream. Soon we came to a Batta village, whose chief also joined us with more men to act as my body-guard. We now entered a deep gorge, where the sun poured down his most scorching rays, and the rocks and sand threatened to blister my bare feet, and even the Malays complained of the oppresive heat. In one place the foaming torrent rolled up against a high precipice and the only way for us to advance was along a horizontal crevice, where scarcely a monkey would think of venturing to climb. This danger passed, we forded from side to side, and again crossed back and forth over rapids by leaping from rock to rock, some of which were above and some just beneath the surface of the boiling water. Then we came to an open area of high grass. The tall native, in accordance with the rajah's orders, marched ahead with his huge sword grasped in his right hand, and its naked, rusty blade resting on his bare left arm. In this defiant attitude, he was indeed the personification of bravery; but, I had so little faith in the necessity of our having such a doughty warrior, that I began to ridicule his appearance to the rajah, when suddenly this brave gave an ugly nasal grunt, and brandishing the sword high above his head, brought it down with a heavy, cutting stroke on some object in the path before him. "What

is the matter?" every one asked. "A great snake was crossing the road", he replied, an agreeable statement for me to hear, considering that I had adopted the Malay costume and had no clothing on below the knee; but while he was flourishing his weapon and getting ready to strike, the huge reptile had glided away in the tall grass. The rajah now showed a bare spot by the wayside, where a Batta, who had been guilty of adultery, had been killed and eaten by his fellows only a few days before. All the others in the party confirmed this story in every particular. A little farther on was a Batta hamlet consisting of four houses on high posts. One was small and stood apart from the others, and in that they stored their rice. The other three were dwelling-houses, and their walls, gable-ends and floors were made of plank, and the roofs were thatched with dry grass. Having a great curiosity to see the internal arrangements of a house of cannibals, I climbed up a ladder of five or six rounds at one end of the building and being invited in I took the place assigned me on the floor. There was no bench nor stool, nor anything, so, according to Batta etiquette, I rested my back against the side of the house. The whole building was in one room, without any apology for a partition. From the number of the inmates, I saw that probably four families dwelt in this single apartment, and this suspicion was strengthened when I noticed a rude fireplace, without any chimney, in each corner. On enquiry, I was informed that my conjectures were correct. "But how do you know," I asked, "what space belongs to one family and what to another?" One of them, who could understand a little Malay, gravely rose, and coming to my side, in answer to my query, pointed to a crack in the floor.

Two sections at right angles showed that the strata of the cliff were nearly horizontal, and composed of materials that had been

recently formed by the decomposition of the adjoining syenitic rocks. The height of this formation above the sea, I judged to be eight hundred and fifty feet, which is my lowest estimate of the elevation of this part of the island in recent times. On our return a heavy rain set in, which greatly swelled the stream and caused the strong current to threaten to sweep us off the slippery rocks, when we forded its waters. Sharp lightning flashed in broad sheets around us and the thunder echoed and reechoed in the deep ravine. By the time I reached the Resident's house I was so bruised and lamed, that I did not rise for thirty hours.

A few days afterward, a rajah came from his village on the coast near Barus, a small port about thirty miles from Siboga towards Achin. He said that some neighboring Battas had captured two of his men and had already eaten one of them and were keeping the other to eat him also and that he had come to ask the Dutch government to send soldiers and compel those cannibals to deliver up their intended victim. In the neighboring Silindong valley the missionaries have been for some time trying to educate and convert these wild Battas. I met one of them with his new bride at the governor's residence when I arrived back at Padang. The lady had arrived but a short time before from Holland, and they were just starting on their wedding tour to their future residence among the cannibals. The other missionary was at Siboga and I was present at his wedding. His wife was a young lady of seventeen, and in both of these matches neither of these gentlemen had ever seen his betrothed before she arrived, except in a photograph. Madam Pfeiffer, according to her own account, traveled far among these cannibals and the Dutch officials assured me that she could only have made such journeys, because the natives believed she must be a witch and was, therefore, in league with evil spirits. In

1835 two American missionaries, graduates of Amherst College, started from this port for the interior, but in only a few days, both of them were attacked and killed by the Battas. In the early part of the last century a very considerable trade in pepper was carried on by American vessels, chiefly from Boston and Salem at the harbors between this port and Achin, a region known to our sailors as the "Pepper Coast". Serious troubles often arose between their crews and the natives, and in 1830 nearly all the officers and crew of the ship Friendship of Salem were overpowered and murdered but a little distance north of this harbor. The region where the pepper vine is mostly cultivated now is on the river Ogan, south of Palembang.

When the inspector and I left Padang, it was planned that a man-of-war would come for us in order that we might avoid the long return journey by land; but when the ship arrived, she was under orders to take the Resident and go first to Sinkel, the farthest point up the coast held by the Dutch. I therefore returned in a native prau. One night a violetn tempest struck our frail craft and we narrowly escaped being wrecked amidst the heavy breakers on a coral reef. At sunset the next day we were just off the great mountain of Ophir. Thousands of small, fleecy cumuli at that time covered the sky, and as the sun neared the horizon, all these clouds were changed into the brightest hues. Indeed the whole firmament seemed literally paved with small blocks of pure gold, most of which were bordered with a narrow margin of purple. One end of this great arch seemed to rest on the crests of the mountains east of us, while the other end came down to the Indian Ocean. The western side of the top of Mount Ophir was lighted up with tints of surpassing richness. All this glorious display in the heavens was so perfectly repeated, even to the minutest details, on the calm sea, that it was difficult to tell which to admire more,

the sky or the ocean. Of all the rich sunsets I enjoyed during my travels in the tropical East, this was by far the most magnificent, and never before did I imagine that it was possible for any one to behold a scene so nearly approaching the splendor of the Celestial City, described in the apocalyptic vision as being "of pure gold, like unto clear glass."

After arriving safely at Padang, I made a second journey up on the Highlands of the Menang-Kabau country over the portion I had not seen on my first journey of that historic land, which is said to be the original home of the Malay race. Afterward the mail steamer brought me down the coast to Benecoolen and I began my plan to cross the whole island to Palembang, and arriving at Banca, take the steamer, which touches at that island while on her route from Batavia to Singapore, and in this way to close my pleasant journeyings in the Archipelago of the Netherlands India.

Benecoolen is well known because it was the residence of Sir Stamford Raffles while he was governor of the English possessions on this coast, from 1818 to 1824. From 1811 to 1816, while the whole archipelago belonged to the English, Sir Stamford was the British Governor General and resided near Batavia and it was contrary to his wise and urgent advice that Java and its rich dependencies were finally ceded back to the Dutch; and the great direct revenue, which those islands have since constantly yielded to Holland, have proved in an emphatic manner the correctness of his statesmanlike foresight. The highest Dutch officials constantly repeated to me the statement that after the treaty with their government was finally concluded, the British representatives then produced the last letter from Gover-nor Raffles and it was found that the seal was still unbroken, so ignorant were they of this archipelago and so indifferent to the

future wealth of these fertile islands.

Sir Stamford's taste for nature history was a very marked characteristic of that great man. During a visit to London before he came to this port, he founded the Zoological Society and began the famous Zoological Gardens, which now form one of the chief attractions to travelers from all lands to visit that great and wealthy metropolis. When he sailed away from this place, his ship was nearly loaded with the rare animals of this interesting region; but the same evening, when not more than fifty miles from these shores, the vessel took fire and the passengers and crew barely escaped with their lives.

April 21st, 1866. Today commenced my overland journey on horseback, the only mode of traveling known in this region. From Bencoolen we crossed the margin of level land, that in this part of the island extends from the sea shore back to the great or Barisan range of mountains, which extends throughout the whole length of Sumatra and along this part of the border of the Indian Ocean.

We were evidently entering at once into a wild country, for soon we saw the recent tracks of an elephant in our narrow path through the jungle, and our native attendants, who are good judges, assured us that they were made only yesterday. Soon after, a spot was pointed out to us by the roadside, where, not long before, were found fragments of the clothing, and part of the body of a native, who had been torn to pieces by tigers. Near by was a rude trap for these destructive beasts of prey. It consisted of a small place enclosed by a paling, with two large trees placed horizontally, the one above another, so that when the tiger puts his head between them to seize the kid within the paling the upper beam will fall on him and hold him fast by its great weight. The natives then hear his groans and

hasten up to spear him w th their lances.

At Suban, seventeen miles up the Bencoolen river, were evidences of a coal formation, where the government engineers have estimated that 200,000,000 cubic yards could be mined, and five miles farther up the stream I found another extensive deposit, but the main difficulty in developing this property is the lack of a properly sheltered harbor on any part of the adjoining coast. The Barisan or Coast Range is here, as elsewhere, generally higher than the ranges parallel to it on the east, and therefore it forms the water-shed between the east and west coasts. All these mountains are covered with a most dense forest. In the early morning, while the air is still and clear, troops of black monkeys made the ravines and valleys continually resound with their loud trumpeting. From the top of the pass over this first and highest mountain chain, at a height of from two thousand five hundred to three thousand feet, a magnificent view is obtained, to the southwest, of the lowlands extending to Bencoolen and of the heavy surf breaking on the coral reefs along its ocean shore. On the eastern, or interior side of the chain was spread out before me the lovely and highly fertile valley of the River Musi, which takes its rise a little farther to the north. In the midst of this valley was the kampong and Dutch outpost, Kopaiyong. From this pass our descent proved to be as rapid as our ascent had been on its western side. The height of this plateau is from fifteen to eighteen hundred feet above the sea. It is a complete repetition of the fertile plateau around lake Sinkara on the Padang Highlands. Its soil is a fine, black loam. Its chief products are tobacco and coffee, both of which thrive here abundantly. This is considered, and no doubt rightly, a very healthy region. There are no "wet and dry seasons" as in Java, but I was assured that showers occur here

every few days, generally in the afternoon. Although the soil and climate of this valley are so favorable for the development of its people, yet the natives, until a few years ago, clothed themselves only with the bark of trees. The present amount of trade in a year amounts to a hundred thousand guilders i.e. to forty thousand dollars. The population of the region appears to be but a small fraction of what it is on the Padang plateau; if it were as large and as industrious, the upper valley of the Musi would soon be transformed into one great garden.

Seventeen paals, or nearly sixteen miles brought myself and party to Tanjong Agong. The coolie who marched beside my horse, carried my Spencer's breech-loading rifle ready for instant use. It caused the natives to manifest the greatest respect for us, especially when my servants declared that I needed only to put it to my shoulder, pull the trigger, and there would be a constant stream of bullets. From the tops of the low hills I enjoyed fine views of the Barisan or coast chain. The outline of many of its peaks showed that they were formerly eruptive cones. In this part of our route the road was filled with the tracks and excrements of a herd of elephants, that passed this way yesterday, or the day before. Tanjong Agong is a small village of only twenty small houses, each of which is placed on posts six or eight feet high. A ladder leads up to a landing, which is enclosed by a fence and a gate, to prevent the tigers from entering their houses. The natives keep hens and would have dogs, but they are all destroyed by the tigers. These ravenous beasts infest this whole region in such numbers that the rajah, who can speak Malay very well, assures me that during last year, <u>five</u> of his people were torn to pieces by them, while cultivating rice in the fields or while traveling to the neighboring Kampongs. No native here ever thinks of

going even the shortest distance by night. The government house, in which I lodged for the night, was built of bamboo and surrounded with a high paling of sharpened stakes which also included the stable. The controleur, who has sent on food for me in advance, informs me that before the paling was completed, he put his horse in this stable, and at midnight he heard a loud howling and neighing and the natives shouting out to each other to come with their arms. A tiger had come out of the adjoining forest and had sprung upon his horse from behind, and the natives were attacking him with their spears. He lost his horse, but had the satisfaction of carrying away the tiger's skin. Those who complain of scarcity of large game ought to come here. It is not inaccessible by any means, and tigers and elephants are exceedingly abundant, and the rhinoceros is not rare. While nearly all the large mammals here have a particular area which they frequent - as the low coast region, the plateaus of these tropical lands, or the higher parts of the mountains - the rhinoceros lives indifferently anywhere between the sea-shores and the tops of the highest peaks. This species has two "horns", the first being the longer and more sharply pointed, but the Java species has only one. The natives here know nothing of the frequent combats between these animals and elephants, that are so often pictured in popular works on natural history.

Near here we passed over an elevation, on the top of which was a large and most thriving coffee-garden, and close at hand rice-fields, which were yielding large crops. This garden had been very lately planted, and yet all the trees, which were old enough to bear, were loaded down with choice fruit. The rice-fields showed that an abundance of food could be easily raised here, and the only thing that is wanting is a sufficient number of laborers to carry on a plantation.

The elevated situation of this country makes it a very healty location for foreigners, and with a proper amount of labor and capital, it would rival the most fertile parts of Java. At Tebing Tingi, which is the principal place of this part of the valley of the Musi, the Assistant Resident asked me to stay with him and rest for several days. The whole distance from Kopaiyong is forty-five paals, over forty miles, and I have traveled it with the same fine saddle horse supplied me by the controleur of that village. Such is the generous manner in which the Dutch officials of such remote regions treat their guests, who come recommended by the higher authorities. From Tebing Tingi on the Musi, I crossed the country for forty paals to Lahat, at the head of navigation on the Limatang, a tributary. This route brought me into one of the most unfrequented parts of Sumatra. In this dense jungle, there are various species of rattans or Calamus, a genus of palms, that has small, reed-like trailing stems, which are in strange contrast to the erect and rigid trunks of the cocoa-nut, the areca, the palmetto and other palms. It seems paradoxical to be told that this is a palm, and the high, rigid bamboo is a species of grass.

In the afternoon, our pathway was strewed with fresh boughs, of which the leaves were still fresh and green, showing we were closely following a herd of elephants and might find ourselves surrounded by them at any moment. Several natives had joined our party, for here they always travel only in companies through fear of the tigers. While we were passing a dark wood, suddenly a heavy crashing began in the thick jungle, not twenty paces from where I was riding. All the company set up a loud and prolonged yell, and the lone wild elephant slowly retreated and allowed us to proceed unmolested. The natives,

who are not afraid to meet a whole herd of elephants, are always alarmed at the prospect of coming near a single, lone mail, or "rogue" elephant, which has been driven out of the herd by the stronger males. They are apt to wreak vengeance upon any traveler. Although they are so abundant here in Sumatra, there are none of them living wild in Java. After twelves hours continuously in the saddle I was thankful to arrive at half past six at a stockaded fort, and escape the tigers and a driving tropical storm. That evening the captain of the garrison showed me the skin of a large tiger, which, a short time before, had killed three natives in four nights. The village was surrounded by a stockade to keep out these savage beasts, and the gate was guarded by a native soldier. One evening this fearless beast stole up behind the guard and as a native said, who saw it, killed him instantly with a single blow of its paw on the back of his neck. It then caught him up and ran away with him. The second evening it seized and carried off a native, who was bathing in a neighboring stream. The next night it carried away a second guard. The captain now found he must make every effort to destroy it and save his men, and he started out with eight men, determined to hunt it down. They tracked it into a lair hidden by tall grass, until they heard a sharp growl, when all fired at once and killed it instantly. It proved to be a very large female and she had evidently been so daring for the purpose of procuring food for her young.

The next morning, I continued my journey accompanied by a soldier, who was one of the party that had just killed the tigress. We had not gone more than half a mile before we came upon the tracks of two tigers, a large one and a small one, probably a full grown female and her young, which had passed along the road in the same way we

were traveling. The perfect impressions of their feet showed that they had walked along that muddy road after the rain had ceased, half an hour before. We were expecting to meet them at every turn in the road and we proceeded with the utmost caution, until the sun was high and it became scorching hot. At such times these dangerous beasts always retreat into the cool jungles.

This day our road lef over a series of hills, and from the top of one of them we had a fine view of the Pasuma country, where the Dutch are now subduing the natives. It is a plateau, which spreads out to the southeast and east from the feet of the great Dempo, the highest and most magnificent mountain in all this region. It is the most southern and eastern of the many active volcanoes on this island, and like the Merapi in the Padang plateau, it does not rise in the Barisan or main chain, nor in one parallel to it, but in a transverse range. The height of Mount Dempo has been variously estimated at from ten thousand to twelve thousand feet, but I judge that it is not higher than the Merapi, and that its summit, therefore, is not more than nine thousand, five hundred feet above the level of the sea. The Pasuma plateau is undoubtedly the most densely-peopled area in this part of Sumatra. The villages and fortified places of the Pasumas are located on the tops of hills and they fight with so much determination that they have recently repulsed the Dutch force from one of their forts with a considerable loss.

At Limatang, my horseback journey was finished and I hired a boat to take me to Palambang. I had rode from Bencoolen, by the route taken, about one hundred and twenty pals or one hundred and twelve miles. I had chanced to make the journey at just the right time of the year. The road during April is good enough for the native carts,

called padatis, and for the transport of light artillery. But for most of the year a tall rank grass fills the whole pathway. The government obliges the natives living near this, the only highway, to cut away the grass and repair the bridges once a year and I began my journey just as most of this work was finished.

At Muntok, on the island of Banca, which is famous for its rich yield of tin, I had the pleasure of meeting the chief mining engineer. The tin is disseminated in small grains through masses of granite, which has slowly decomposed, and the clay and sand thus formed have been washed into the nearest depressions. The tin being the heaviest of these materials, has settled near the bottom of each basin, and it is obtained by washing, just as in the process of placer mining or washing similar alluvial deposits for gold.

On the 18th of May, 1866, I entered the harbor of Singapore, one year and fourteen days after landing in Java. During that time I traveled six thousand miles over the archipelago, and yet with the exception of landing at the insignificant Portuguese village of Dilli at the northern end of the island of Timor, I did not once pass beyond the area of the Dutch flag, so great is the extent of their eastern possessions, the distance from the western end of Sumatra to the Dutch boundary of New Guinea, being almost exactly as far over our globe, as it is from the Rock of Gibraltar at the entrance into the Mediterranean to the North Cape on the borders of the Arctic Ocean.

AUTOBIOGRAPHY

of

ALBERT S. BICKMORE, Ph.D., LL.D.

Volume II

(Set 5)

DECEMBER 1867 to 1870.

Immediately on my arrival back to New York, in December 1867, from three years travel in the Orient, and over Siberia, I called upon the gentleman, who had previously expressed the generous hope that when my proposed journeys were completed and I had returned to America, our destructive Civil War would be over, and that then a period of such general prosperity would have set in, that favorable conditions would then exist for founding an institution of the magnitude which we hoped our Museum would attain in the course of time.

The first year after my return was largely occupied with the preparation of my "Travels in the East Indian Archipelago". A joint arrangement was made by Mr. John Murray of London and Messrs. D. Appleton & Co. of New York for the publication of the volume, which was later translated into German and issued by Herman Tostenoble in Jena. During the printing of the text, at the invitation of Mr. W. H. Appleton, I resided with him at his beautiful home at Riverdale on the Hudson. When the volume was finished Rev. Dr. E. Dodge, President of Madison University at Hamilton, N.Y., invited me to accept a Professorship of Zoology and Geology, founded at that time by Mr. J. B. Colgate, for whom the University has since, appropriately, been named.

Later, the Lowell Institute made me a most acceptable offer for a course of twelve lectures on China.

A series of my shells from the Moluccas I presented to the Boston Society of Natural History, as a partial return for the generous aid my friends in Cambridge and Boston had given me for my journey to the Spice Islands. In return for an advance made to me by Mr. J. Warren Merrill of Cambridge, a set of my birds was

forwarded as his gift, to Colby College at Waterville, Maine, and Mr. J. B. Colgate purchased the remaining birds for Madison University and I took them with me when I went to Hamilton as Professor. My experience with my classes proved to be most happy, and many of the Faculty and village people came to see the new collection of birds and attend my lectures. At this time a young man came to our village from near the City of Utica and enquired for some one to guide him to the localities, where fossils of the Hamilton Period, were reported to be abundant. He was referred to me, and in his pleasant companionship we studied the neighboring formations as far as Cazenovia. This was one of my young friend's first geological excursions. He was an earnest enthusiast in his chosen occupation, and soon became an eminent authority on strata of the Archaean Age. On account also of his marked administrative ability he continued to rise in position until he became the Director of the United States Geological Survey. He is now worthily and widely known among all scientists as Dr. Charles D. Walcott, the honored Secretary of the Smithsonian Institution.

During my absence of three years in the Orient and Northern Asia, great changes had occurred in our nation. The war had closed a few months after I sailed, but the anxious period of reconstruction followed and permanent prosperity throughout our land was only assured at about the time of my return. The war had, however, favored the development of our plan in a remarkable manner. Our people had become accustomed to the great expenditure necessary to maintain our free government and remove the stain of human slavery from our land. Millions of dollars came to be regarded in the same manner that hundreds of thousands had been before the great conflict began. The gentlemen who were before my departure solicitous for the future

of our nation, were now cheerful and hopeful. Their number included Mr. W. E. Dodge Jr. whose father was then president of the New York Chamber of Commerce, Mr. W. A. Haines of Halstead Haines & Co., who possessed the largest private collection of shells in the country; Mr. D. Jackson Steward of one-hundred-fifty Fifth Avenue, who had a smaller collection but of very choice specimens; and Mr. Robert L. Stuart, whose attractive residence was then at the corner of Twentieth Street and Fifth Avenue, where he had gathered besides a library of rare books a good collection of shells and many beautiful specimens of minerals.

Mr. Dodge, with whom I corresponded while travelling in the East, and who was always particularly sympathetic and helpful, had just before undertaken to lead in the erection of a large building for the Young Men's Christian Association at Twenty-third Street and Fourth Avenue, and was therefore, obliged to express his regret that he could not join in the new movement at once, but he assured us he would be happy to do so at a later date. However, he said to me, "Professor, I have a friend, who is just the man to take a prominent part in such a great public institution, as you desire to see established in our metropolis. He is a wholesale importer of plate glass and his place of business is near by on Maiden Lane. I will give you a letter of introduction of him if you will present it in the same earnest manner in which you have asked for my cooperation," and I replied, "if you will kindly permit me to sit here quietly until you can prepare such a letter, I will take it directly to his office." This letter was directed to Theodore Roosevelt (Senior), who received it most courteously and permitted me to tell him of my studies with Professor Agassis, my interview with Dr. Ackland in Cambridge and of my journeys and present hopes. His prompt and

cordial reply was that he would heartily join the gentlemen whose names had been suggested as leaders in the new enterprise. Mr. William T. Blodgett, whose office was near on Pearl Street, and Mr. Howard Potter of Brown Brothers and Mr. J. Pierpont Morgan each made a similar cordial offer of support. As Mr. W. E. Dodge's name could not at that time be added to our list, his brother, Mr. A. G. Phelps Dodge, was invited in his place. Then I asked Mr. Roosevelt if it would not be wise to invite some young lawyer of marked promise to join and aid us in preparing a draft of a special Charter to be passed by the legislature, and a Constitution and By-laws for our own governance. He replied "It would, indeed, be wise and I will give you a letter to a gentleman, who is a graduate of Harvard, and whom we all would be gratified to have associated with us." This note was addressed to Mr. Joseph H. Choate, and when I presented it o him, he asked me to convey to Mr. Roosevelt and the other gentlemen an expression of the pleasure it would afford him to join them and to state that he would always be very happy to give any legal advice in his power to aid such a grand cause.

To arouse yet greater enthusiasm in our new enterprise and to consider its future scope and location, informal conferences were held at the residences of Mr. W. A. Haines and Mr. Benjamin H. Field and we also met with Mr. Robert Colgate, who from the beginning expressed the most sanguine hopes of the rapid growth and future usefulness of our proposed museum.

At one of our conferences the following letter was prepared and I took it round on the following day and obtained the signatures it bears. This was our first official paper signed by members of the proposed organization.

New York, December 30th 1868.

Commissioners of the Central Park

Dear Sirs:-

A number of gentlemen have long desired that a great Museum of Natural History should be established in Central Park, and having now the opportunity of securing a rare and very valuable collection as a nucleus of such Museum, the undersigned wish to enquire if you are disposed to provide for its reception and development.

James Brown,
Alex. T. Stewart,
Benj. H. Field,
Adrian Iselin,
Robert L. Stuart,
Marshall O. Roberts,
Theodore Roosevelt,
George Bliss,
Morris K. Jesup,
William T. Blodgett.
John David Wolfe,
Robert Colgate,
I. N. Phelps,
Levi P. Morton,
W. A. Haines,
J. Pierpont Morgan,
A. G. Phelps Dodge,
D. Jackson Steward,
Howard Potter,

Office of the Board of Commissioners
of the Central Park, New York, January 13, 1868

Gentlemen:-

The Commissioners of the Central Park have received your communication, in which inquiry is made if they are disposed to provide for the reception and development of a large and valuable collection, as a nucleus of a Museum of Natural History.

The Commissioners appreciating the views you so kindly express, entirely concur in the desirability of the establishment

in the Park, that shall become an aid in the great Educational System of the city, concentrate and develop scientific efforts in all departments of Natural History, and at the same time be an instructive and acceptable resort for the people of the city, and for the throng of strangers that visit it.

The Commissioners of the Park will very gladly receive the collection to which you allude, and will use their best exertions toward the establishment of a Museum of Natural History, of an extent and excellence in all its departments that will be creditable to the city, and in their efforts towards the development of such an institution the Commissioners of the Park will highly esteem your valuable co-operation.

I am, gentlemen, with great respect,

(Signed) Andrew H. Green,

Comptroller of the Central Park.

To:

James Brown,

Alex. T. Stewart,

John David Wolfe, and others.

On the nineteenth of January, 1869, a meeting of the gentlemen who signed the above note of inquiry, was held at the residence of Benjamin H. Field Esq., and the following resolutions were unanimously passed:

WHEREAS, Nearly all the Capitals in Europe and more important cities of our own land, including Boston, Philadelphia, Washington, and Chicago, possess instructive and valuable Museums of Natural History, while New York --notwithstanding its metropolitan position-- is still destitute of such an institution:

RESOLVED, That, recognizing the necessity of such a Museum as a means of recreation and education, and desiring its establishment upon a scale commensurate with the wealth and importance of our great city, we have heard with much satisfaction, that the opportunity is now presented of securing by purchase in Europe, the largest and most valuable collection of objects in Natural History which has been offered for sale in many years.

RESOLVED, That in our judgment immediate action should be taken to secure this or some other collection as a nucleus of a great Museum.

RESOLVED, That, therefore, a Committee be and is hereby appointed to raise the necessary funds, and to act as Trustees for and dispose of the same, and of the collection when acquired, and with full powers to do whatever may be requisite or needful in connection with the business; said Committee to consist of such signers of the recent letter of inquiry, dated December 30th 1868, and addressed to the Commissioners of the Central Park, as may consent to serve, with power to increase their number to twenty.

The following gentlemen have already consented to serve as a Committee and Trustees in accordance with the above Resolution.

John David Wolfe,
Robert Colgate,
Benjamin H. Field,
Robert L. Stuart,
Adrian Iselin,
Benjamin B. Sherman,
William A. Haines,
Theodore Roosevelt,
Howard Potter.
William T. Blodgett,
Morris K. Jesup,
D. Jackson Steward,
J. Pierpont Morgan,
A. G. P. Dodge,
Charles A. Dana,
Joseph H. Choate,
Henry Parish,

At this same conference at Mr. Fields residence, the necessity of having a charter became evident and the matter was referred to Mr. Choate, who subsequently asked me to describe to him in detail, how Professor Agassiz had organized his great institution and its relations to Harvard University, and to the educational system of the State of Massachusetts and also to add any suggestions from my own experience.

With the aid of these data, he would prepare a draft of a Charter embodying these ideas, and he added that when the gentlemen already interested in our new enterprise should meet for a conference this draft could be amended in any manner they might indicate. In preparing this paper, we soon came to a matter, which for several years had seemed to me likely to prove of great importance, and that was the corporate name we should adopt.

I said that all thoughtful observers of the English people agreed that their many lovers of science were remarkable, not only for their devotion to Her Majesty, the Queen, but also to their great national institution, the British Museum.

In all my interviews with the prominent officials of Her Majesty's Government in the Orient, this noble characteristic had been conspicuously confirmed. I suggested, therefore, that we select a name which will, likewise, be national, and which will indicate our expectation that our museum will ultimately become the leading institution of its kind in our country and prove a blessing to our whole land, and hence I proposed that we call it, the American Museum of Natural History. This name met Mr. Choate's approval and he entered it in his draft.

A short time afterward, at the invitation of Mr. John David Wolfe, a meeting was held at his house, at the corner of twenty-

fourth street and Madison Avenue, where Rev. Dr. Parkhurst's church is now located. Mr. Choate then read and explained his paper and it was unanimously adopted without the modification of a single word.

Then I was asked if I was familiar with legislative procedure and could take charge of the proposed act of incorporation and I replied that I knew only what I had learned in Cambridge of Professor Agassiz's methods of receiving and interesting committees from the Massachusetts legislature, when they visited his museum, and of his remarkably successful manner of arousing enthusiastic support from the patrons of the University, and I thought that probably I had learned more of his skilful methods in these matters than I had even learned about the shells in his museum of which I had charge; and that I would willingly undertake what all present seemed to think would probably prove a disagreeable if not a difficult task.

In soliciting letters to the important members of the Legislature, we were especially cautioned to secure one to a senator from our city, whose influence was said to be growing so rapidly that it promised soon to become of paramount importance upon the fate of all laws relating to our metropolis. A friend of Mr. Samuel J. Tilden procured from him a favorable letter of introduction for me to this senator, and later when I learned the exact situation, I realized that that letter was the one credential I needed to insure the success of my mission.

Mr. Roosevelt, who was particularly anxious that we should not fail, tookme aside and informed me that his recent experience at Albany led him to fear some members of the Senate or House might seek to amend Mr. Choate's carefully prepared draft by adding their own names, and that if they did this in a determined manner, he authorized me to accept such an undesirable modification without too serious

a remonstrance, for he himself had just been obliged to adopt that course in order to procure a charter for a dispensary.

Taking Mr. Tilden's and other letters, I went to Albany to the old Delavan House, which stood where the fine new depot of the New York Central and Hudson River Railroad is now located. Approaching the head clerk, I remarked that I had heard that a certain senator whom I desired to meet resided at that hotel, and he replied that my information was correct. I then said to him that I was confident he would be pleased to do Mr. Tilden a favor, and he answered "By all means." I then explained that I had the honor to be the bearer of a letter of special importance from Mr. Tilden to the Honorable Senator, and that he would do me a kindness if he would secure for me a private interview. He said "while we have been talking the senator has gone up to his room" and he sent a messenger to him at once, and the reply came that the senator was in his room alone and would be very happy to see me.

I found him to be a man of portly dimensions and comfortably seated in a large arm chair. I introduced myself and my business by saying: "Senator I am honored by your friend Mr. Samuel J. Tilden, with this letter, and I have also these other letters from other leading citizens in New York City." "Well, well; what can I do for Mr. Tilden?" "These gentlemen, Senator, whose names are on this paper, have asked me to state to you that they desire to found a Museum of Natural History in New York, and if possible on Central Park, similar to Professor Agassis's great museum in Cambridge---you know of that intitution, Senator?" "Certainly; certainly" was his prompt reply, (and now I must confess that for an instant a cruel doubt flashed over my mind, as to whether he had ever really heard

its name mentioned before in all his life; but that was not the subject I was sent to Albany to discuss) and I continued "Senator, I hope you will agree with these gentlemen, that to found such a grand institution as they have in mind, it is proper and necessary for them to have a charter, creating them a body corporate by a special act of the Legislature, and Mr. Joseph H. Choate, whom you know well?"---- "Yes, he is a partner of Mr. Evarts"----"has carefully prepared this draft of a bill, which they have considered and unanimously approved, and they have requested me to respectfully solicit you to do them the important favor to take charge of this measure." "All right my young friend, I will see your bill safely through," was his reply as he thrust our carefully prepared document into his capacious outside pocket. Thanking him for the privilege of this kindly interview, and the important aid he generously offered I withdrew.

But I did not go immediately back to New York, but quietly kept out of sight until the evening session of the senate, where I had the gratification, while the order of business was the "Introduction of Bills", to see our Senator promptly rise in his place and by "unanimous consent" present our bill which was read twice (by its title) and referred to the Committee on Cities. After the close of the session, I learned from the Clerk of the Senate that a meeting of that committee would be held the next afternoon and the room, in the old capitol, where they would assemble. When the bill came up in the committee, of which our Senator was not only a member, but certainly a most influential one, I was sitting by ready to make any explanation that might be required, but no hint of any question was made and the clerk in a most perfunctory manner called the roll and the chairman announced that the bill was "reported favorably and recommended for passage."

A day or two later the bill was passed in the Senate without a dissenting vote, and was immediately sent down to the House, whither I followed it most persistently, for I never allowed that or any other bill which was subsequently confided to my care, to remain for an hour in the hands of any one, without my being fully aware how far it had progressed. This unceasing, personal care not only prevented my bills from ever being amended, but also secured their passage so promptly that it was a mystery to many of our friends how we managed our measures so successfully while they constantly experienced annoying and unexpected delays instead of securing the active and helpful cooperation of every member. The Assembly likewise enacted our bill quickly and sent it to Governor Hoffman, who on April 6, 1869 looked over my credentials, heard my statement, and announced that he was very happy to sign an act of incorporation for an institution which promised such great benefits to our city.

And thus our Charter became a law, in a remarkably short time after the bill had been introduced into the Senate by the Hon. William M. Tweed.

It certainly proved to be wise that we asked Senator Tweed to take charge of this important measure because with his endorsement its prompt passage was assured, and also because it was certain that it would not be amended in the slightest degree, for no legislator, even in those days, dared to suggest the slightest modification to a bill which had been introduced by Mr. Tweed.

On the eighth of April, 1869, the gentlemen named in the first section of the Act, met at the residence of Mr. Theodore Roosevelt in East twentieth Street, and unanimously accepted the Charter, which was precisely in the form of the original draft, previously presented for their consideration by Mr. Choate. And now, after thirty nine

years of uninterrupted prosperity, this document, still unchanged, remains the charter of our great institution.

At one of our early conferences I was asked to relate, in a brief way, how Professor Agassiz had founded his museum in Cambridge; and I stated that the land was presented by the University and that the building was erected and the collections were purchased and maintained by subscriptions mostly secured by the Professor from his personal friends, the generous patrons of the University.

The State of Massachusetts had made a large grant of One hundred thousand dollars from the proceeds of the sale of its Back Bay Lands in Boston; and its legislature had afterwards, frequently appropriated smaller sums, in return for which the Professor's lectures were open free to all the teachers of the commonwealth.

At the time our conferences began in 1868, there was in New York City only one great institution, of which all citizens were justly proud, and that was the Astor Library. But Mr. John Jacob Astor, the founder, in his deed of gift, did not include in its list of trustees any of the officers of the city government.

Later in when Mr. James Lenox planned his great library, it was organized in the same manner.

Inasmuch as we could not hope unaided to be able to raise sufficient funds for purchasing land and ultimately erecting a suitable fire-proof edifice, I ventured to suggest that we play to buy only the specimens and books, and that we cordially invite the City, represented by its Commissioners of the Central Park, to join us in a plan for promoting the public good by furnishing for our permanent occupation the necessary land and buildings. This proposition was in marked contrast to the form that up to that time had prevailed in our city of creating such institutions from private generosity alone.

In the new way, the public would contribute only a part of the total sum required, but would receive directly the benefit of the whole investment.

This cordially cooperative plan proved to be more widely acceptable and useful than I had first imagined; for the next year, when our sister institution, the Metropolitan Museum of Art, was organized, it followed exactly the plan which our experience had already proved to be both fortunate and wise, and which had been most cordially approved by our leading citizens and by the public press.

Another striking example of the future benefits of such a happy confidence and cooperation has since been manifested in the great development of the New York Library, Astor, Lenox and Tilden Foundations. When Mr. Tilden died, he had given, as he supposed, the larger part of his great estate for a free public library. Some of his trustees were associated with the trustees of the two Museums and understood well that if the three great libraries of the city were united into one, the city could well afford to provide for that one, the most central and desirable location on Manhattan Island, namely in Bryant Park at the corner of Fifth Avenue and Forty-Second Street, and also to erect for that one principal library such an imposing and monumental edifice as would be worthy of our metropolis. Mr. Carnegie's great gift for the Branch Library Buildings, was also made on a similar condition, namely that the city should furnish land and provide for a liberal maintenance. Libraries of prosperous societies have united in this plan, and when soon the beautiful central Library building at Forty-second Street shall be finished, New York City will have a more nearly complete library system than any other metropolis in the world.

When in the New York Zoological Gardens were organised

and likewise the Botanical Gardens in , they were placed upon the same relation to the city, and this wise action secured for them the same confidence from the public that the museums had enjoyed that they would also be wisely and economically administered and meet with a like gratifying success.

Now after the lapse of nearly forty years we can with difficulty realise how alienated our prominent citizens were from all departments of our municipal government in 1868.

The remarkable opportunity for purchasing rare and beautifully mounted birds and mammals mentioned in our first letter to the Park Commissioners and in the foregoing resolutions, referred to the property of Madame Edouard Verreaux of Paris, whose husband had died a short time before, leaving the largest and choicest collection of the kind which had probably ever been offered for sale at one time.

All lovers of the beautiful agree in taking great pleasure in the brilliant and varied plumage of rare birds, and we felt confident from the beginning of our movement that we would be generously supported in our efforts to place within the Central Park such attractive specimens for the education of the young and the enjoyment of all our citizens.

To start the subscription for the purchase of such beautiful collections, Mr. Potter and Mr. Roosevelt took the paper to Mr. James Brown and secured his name for twenty-five hundred dollars, Mr. John David Wolfe added his name for a like sum, and then Mr. Ansen Dodge and I took it to Mr. A. T. Stewart, who remarked to his companion, Judge Hilton, that the amounts were well kept up, and on the Judge's cordially suggesting the hope that such a good cause might receive more such generous aid, he promptly wrote down his name for a like sum.

Our roll of honor, the first subscription list, then soon contained the following names and generous sums:

Arnold, Constable & Co.,	$2,000.00
Theodore Roosevelt,	1,000.00
D. Jackson Steward,	1,000.00
A. C. P. Dodge,	1,000.00
William E. Dodge,	1,000.00
Morton, Bliss & Co.,	1,000.00
William T. Blodgett,	1,000.00
Robert Colgate,	1,000.00
Morris K. Jesup,	1,000.00
D. H. Barney,	1,000.00
Peter Cooper,	1,000.00
Halstead, Haines & Co.,	1,000.00
I. N. Phelps,	1,000.00
Mr. and Mrs. Jas. Stokes,	1,000.00
Garner & Co.,	1,000.00
Robert L. Stuart,	1,000.00
D. Willis James,	1,000.00
E. H. Hutton,	1,000.00
Wm. E. Dodge Jr.,	500.00
J. Pierpont Morgan,	500.00
Benjamin B. Sherman,	500.00
Benjamin H. Field,	500.00
Adrian Iselin,	500.00
Howard Potter,	500.00
Thomas A. Vyse Jr.,	500.00
George Griswold Gray,	500.00
Gouverneur Kemble,	500.00
C. B. Potter,	500.00

John Sulden,	500.00
Wm. L. Cogswell,	250.00
Theodore W. Riley,	250.00
Henry Parish,	250.00
James M. Brown,	250.00
C. N. Potter,	250.00
Samuel B. Scheiffelin,	100.00

Mr. Roosevelt handed me the above paper, containing contributions amounting to $33,350., and a list of the names of those whose assistance we might hopefully solicit, and he added his blessing for my success, and I went forth to interview these entire strangers. After a week or ten days I came back to Mr. Roosevelt's office and remarked as I placed the paper on his desk, that perhaps I had not succeeded as well as he had anticipated but I had, by no means, failed. As he unrolled the document there came over his face first an expression of surprise and then of radiant delight. We had already secured over Forty thousand dollars, and Twenty-five thousand or Thirty thousand dollars was the most that we dared at first to expect to be able to raise. Turning to me he said, "Professor, New York wants a Museum of Natural History and it shall have one, and if you will stay here and cooperate with us, you shall be its first head. He also added that he knew each of the generous gentlemen whose names were before us, and that many of the charities and benevolent institutions of our city depended upon their liberal contributions for support, and that they should so heartily join in inaugurating a new organization he regarded as most remarkable and especially encouraging.

I continued to solicit additional subscriptions and in a few weeks the following names and generous sums had been added to the original list already given:

W. H. Aspinwall,	$1,000.00
Robert Bonner,	1,000.00
Edward Matthews,	1,000.00
Darling and Griswold,	1,000.00
Edward Clark,	1,000.00
A. A. Low,	500.00
Samuel F. B. Morse,	500.00
Richard Mortimer,	500.00
Rutherford Stuyvesant,	500.00
Marshall O. Roberts,	500.00
John Alstyne,	500.00
Samuel Hawks,	500.00
Benjamin Aymar,	500.00
Jonathan Thorne,	500.00
Meredith Howland,	500.00
Henry L. Barbey,	250.00
Henry Chauncey,	250.00
James W. Gerard,	250.00
Robert B. Minturn,	250.00
Wilson G. Hunt,	200.00

This brought the amount raised our first year up to $44,550.00 (see First Annual Report p.6).

At the beginning of the following year, Mr. Wolfe gave a second sum of Twenty-five hundred dollars, and Mr. Robert L. Stuart, Alexander Stuart, James Lenox, and A. G. Phelps Dodge, each offered One thousand dollars on condition that our fund of Fifty-two thousand dollars be increased to One-hundred thousand dollars, which then seemed to us a large sum. That I should ever live to see the Museum receive one million of dollars from one Patron at one time, as has come to us this year in the princely bequest of our late President,

Mr. Morris K. Jesup, was at that time beyond my most hopeful dreams.

As our Institution was named the American Museum, we began our collections by purchasing first three thousand fine skins of North American birds, gathered through many years by Mr. D. G. Elliot, who is now in charge of the Zoological Department of the Field Museum in Chicago. These were mounted by Mr. John G. Bell of this city who was the famous taxidermist of his day. Mr. Elliot subsequently went to Paris, and notified us that the whole museum was for sale of the late Prince Maximillian of Neuwied near Bonn on the Rhine. The price paid for the entire property was £1,500 Sterling. It contained four thousand mounted birds, six hundred mounted mammals, and about two thousand fishes and reptiles mounted and in alcohol and was especially valuable to scientific investigators of zoology on account of the large number of types, or the first of its species that was described. These unique specimens were the results of the Prince's extensive explorations in South America. Mr. Elliot also selected and Mr. Blodgett purchased for us from the Verreaux collection two hundred and twenty mounted mammals, two thousand eight hundred mounted birds and four hundred mounted skeletons of mammals, birds, reptiles and fishes and from the Vedray collection two hundred fifty rare mammals and birds from Siberia.

Mr. Coleman T. Robinson gave us his collection of American and European mothsand butterflies numbering ten thousand specimens and one hundred volumes describing them.

Baron R. Osten-Sacken, the Russian Consul-General in our City gave the bottles and other insects he had gathered in our country, numbering four thousand specimens. Mr. R. A. Witthaus Jr. presented a fine collection of foreign beetles. Valuable donations of shells were presented by Mr. Robinson, Mr. Haines and Mr. Stewart, and I gave a full representation of all the shells and alcoholic

mollusca, which I had collected during my travels in the East Indian Archipelago.

All this property having been received from the donors named and the great shipments from Paris and Germany having safely arrived, the Chairman of our Executive Committee addressed to the Commissioners of the Central Park, the following important communication:

New York, December 23, 1869.

Andrew H. Green, Esq.,

Comptroller of the Central Park:

Dear Sir:- The Trustees of the American Museum of Natural History having purchased the extensive collection of Mammals, Birds, and Fishes and other specimens belonging to the late Prince of Neuwied, the Elliot collection of Birds, besides a part of the Verreaux and other collections of specimens of Natural History, desire to know if the Commissioners of the Central Park will receive them on deposit within the Central Park, and they would suggest the following as the conditions upon which they would like to deposit them, namely:--

First--- The Commissioners of the Park to provide accommodations in the two upper stories of the building known as the Arsenal and such other rooms as shall from time to time be necessary for the exhibition of the collections deposited by the American Museum, and shall cause them to be furnished with glass cases suitable for the preservation and exhibition ofsuch collections.

Second--- The Trustees of the American Museum to employ their own Curators for the care and arrangement of their collection, and pay them their salaries, all such persons to be subject to the regulations of the Park Commissioners.

Third--- The police force for the protection of the property and the employees for the cleansing and general care of the rooms to be

employed and paid by the Park Commissioners.

Fourth--- The Trustees and Curators of the American Museum to have free access at all reasonable times to the rooms occupied by their collections.

Fifth--- The collections so deposited to be exhibited to the public at least three days in the week in the name of the American Museum of Natural History, the Trustees to have the right to close the collections at such times as shall be necessary for the arrangement and rearranging of the specimens, subject to the regulations of the Park Commissioners.

Sixth--- The collections already acquired, and those which may from time to time be acquired and so deposited, to remain the property of the American Museum of Natural History, to be removed by them immediately after the expiration of six months previous notice in writing to the Commissioners of the Park, or within six months after receiving a written notice from the Commissioners, asking them to withdraw their property from the Park.

Awaiting the favor of an early reply, I am,

Very truly yours,

W. A. Haines,

Chairman, Executive Committee.

Office of the Board of Commissioners of
The Central Park, Bank of Commerce Building,
31 Nassau St., New York, Jan. 21, 1870.

Dear Sir:-

I have the pleasure to acknowledge the receipt of your letter of the 23rd ultimo, relating to the deposits of certain collections with the Park Commissioners by the American Museum of Natural History.

The terms upon which it is proposed to make these deposits are such as will, I think, secure the object that the Museum and the Park Commissioners equally desire, to wit, an establishment that shall afford opportunity for popular instruction and amusement, and for the advancement of the Natural Sciences. If the plan which insures and combines in this enterprise the interests and the means of the private citizen, with those of the public, is production of all the good results that may reasonably be expected, it will probably be made at once an example and incentive for uniting the energies of those interested in other branches of science and art in similar undertakings.

In accepting these extensive and valuable collections on the conditions specified, permit me to express, on behalf of the Park Commissioners, their high appreciation of the enlightened sentiment that has provided so generously for all interested in this department of science, and at the same time, the hope that this auspicious beginning may, by the continued augmentation of similar liberalities, become an unqualified treasury of science alike honorable to the public spirit of the citizens by whom it has been inaugurated and an indispensable aid to those engaged in efforts to increase the knowledge of the science that it is intended to illustrate.

Very respectfully and truly,

Andrew H. Green,
Comptroller of the Park.

To:
W. A. Haines, Esq.
Chairman of the Executive Committee
of the American Museum of Natural History.

Soon after the date of this letter, the administration of the Parks was changed but we were duly notified that the above agreement was continued and confirmed by their successors, by the following

official communication.

Department of Public Parks,
31 Nassau St.,

New York, June 14th 1870.

W. A. Haines, Esq.,
Chairman, Executive Committee,
American Museum of Natural History.

Sir:-

At a meeting of the Executive Committee of the Department of Public Parks, held this day, the following resolution was adopted: Resolved, That the arrangements made by the late Central Park Commissioners with the American Museum of Natural History, and all matters pertaining thereto be referred to Commissioner Hilton, with power to carry out the same, procure the necessary cases, prepare the second and third floors of the Arsenal Building for the Exhibition, and make the necessary provision therefor.

Respectfully,

George M. Van Nort,

C. D. P. P.

In accordance with the authority conveyed in this Resolution, Judge Hilton asked our advice regarding the preparation of the two halls in the Arsenal and the construction of suitable cases and promptly proceeded to make all the improvements and modifications we suggested, including workrooms for our curators in the attic story of the central part of the building. Similarly helpful cooperation has been extended to us by each new Board of Park Commissioners whenever a change has occurred in the city government, and the fact that the Museum has been steadily becoming a greater attraction and a more potent factor in promoting our public education with each succeeding year, has always been most generously acknowledged by the

Park Department and the Board of Estimate and Apportionment.

As our mammals and birds were received, they were arranged in the upright cases on the upper floor, while our shells, insects and smaller specimens were placed in desk cases in the lower second story. To assist me in this varied work, we secured the able services of Dr. J. B. Holder, who had been a surgeon for several years at the Dry Tortugas, where he had enjoyed special facilities for studying corals and other forms of marine tropical life. He remained with us until his death in 1888. His marked ability in the skilful preparation and artistic display of our specimens made his services specially valuable in the early and formative days of the Museum, and his uniformly courteous bearing helped to win for us many friends. His son, Professor Charles F. Holder came to us at the same time as a student helper and a faithful assistant; and he early gave promise of becoming one of our most popular scientific authors.

My duties also included attending all meetings of the Executive Committee and of the Trustees and keeping the minutes. I also prepared the First Annual Report for Mr. Dodge and all of the Second Report for Mr. Roosevelt except the following paragraph relating to myself, which he added to my draft in his own handwriting: "The Trustees have been ably seconded in their laborious duties connected with the organisation and development of the various departments of the Museum by Professor Albert S. Bickmore, whose energy in carrying out the views of the Trustees, has contributed largely to its present means, and we therefore take pleasure in recognising his great usefulness."

The title I chose was "Superintendent" because in the British Museum that was the name given to the head of the Natural History Department, and we were keeping that great institution of London be-

fore us as the grandest and most successful of its kind in the world.

While we were engaged in unpacking and arranging the Verreaux collection, Mr. Roosevelt called upon us one day at the Arsenal, as most of our Trustees were wont to do when they came to drive in the Park, for we were then located conveniently near the main entrance at Fifth Avenue and Fifty-ninth Street. He enthusiastically expressed his appreciation of the beautiful and rare birds which we were receiving from Paris, and then remarked to me that when he came up to drive again, he would like to bring with him his son, named for him, and at that time a young lad about twelve years of age, who, he felt assured, would be greatly interested in our attractive exhibition and in the great institution which we believed we were founding. In reply, I earnestly stated what a privilege I should esteem it to be, to meet a son bearing his father's honored name, and a few days later he introduced to me and I had a delightful interview with Theodore Roosevelt, Jr., who has since become the President of the United States, and the statesman, who has done more than any other citizen in all our history, to promote the conservation and wise development of the great natural resources of our American continent. As he rapidly rose to power and early in life became Governor of our Commonwealth, he has always encouraged us by improving every opportunity to advance the best interests of our growing institution, which has already more than realized his father's fondest hope.

The good progress that was steadily made in the realization of our plans was thus recorded in our Third Annual Report, which was dated November 14th 1871.

"The cases for exhibiting the Museum specimens, commenced last year by the Department of Public Parks, were finished in the Spring, and a

temporary arrangement of most of the collections was made, and a Reception, to which our subscribers were invited, was held on the 27th of April 1871; and though a severe storm occurred on that day, so large a number of our prominent citizens were present that the hearty interest of all classes in the prosperity of our institution was assured at its very inception. Since that date the Museum has been open every week-day to the public, and on Wednesdays and Saturdays it has been literally thronged by hundreds and even thousands, not only of our own citizens, but by visitors from every land to our metropolitan city. The attendance on many days may be safely estimated at over ten thousand.

The exhibition cases first completed proving insufficient for the proper display of the extensive collections of birds and mammals, the Department built similar cases around the octagons at the corners of the building, increasing the exhibition space in the second story nearly two-thirds and in the upper story one-third, and giving both halls a pleasing effect of completeness."

"The Curators have been greatly assisted in their work by the kindness of the Superintendent, the Superintending Architect and other executive officers of the Department at the Arsenal."

An agreement was made with the Department that "Monday and Tuesday of each week be reserved for the Commissioners of Parks, the Trustees of the Museum, all persons contributing or desiring to contribute money or specimens, those wishing to examine the Museum specimens for the purpose of special study, the teachers and pupils of public schools and the inmates of Charitable and benevolent institutions of the City in order that the Museum may be used for educational purposes as well as to afford recreation for the public."

The enthusiasm manifested by all our citizens in our exhibition on the day of our Opening Reception prepared the way for us to make

the following earnest appeal to the Legislature for a large grant which would enable the Park Department to begin suitable fireproof edifices for the permanent occupation of the two Museums:

To the Honorable, the Legislature of the State of New York:

The undersigned, citizens of the City of New York, respectfully petition that authority may be given to the Department of Public Parks in said city to erect suitable fireproof buildings upon the public lands under their charge, for the establishment and maintenance therein of a Museum of Art by THE METROPOLITAN MUSEUM OF ART, incorporated by Act of April 13th 1870, and a Museum of Natural History by the AMERICAN MUSEUM OF NATURAL HISTORY, incorporated by Act of April 6, 1869, at an aggregate cost not exceeding Five hundred thousand dollars for each corporation."

This memorial was signed by over fifty of the Trustees and friends of the two Museums, headed by Mr. John David Wolfe on the part of our corporation and Mr. John Taylor Johnston on the part of the Art Museum. Professor George F. Comfort who was aiding the Art Museum to perfect its organization and I took this petitition up to Albany, where together with Mr. George M. Van Nort, who had charge of the Park bills before the Legislature at that time, and we drew up as follows Section 2 of the Laws passed in 1871, relating to the Department (see page 13 of our Second Annual Report).

"Extract from the Law relative to the Department of Public Parks.

2. The Board of Commissioners of the Department of Public Parks, in the City of New York, is hereby authorized to contract, erect, and maintain in and upon that portion of the Central Park, formerly known as Manhattan Square, or any other public park, square or place in said city, a suitable fire-proof building for the purpose of establishing and maintaining therein, under suitable rules and regulations,

to be prescribed by the Said Board from time to time, a Museum and Gallery of Art, by the Metropolitan Museum of Art, incorporated by Chapter one hundred and ninety-seven, laws of eighteen hundred and seventy, or other institutions of like character; also, a suitable fireproof building for the purpose of establishing and maintaining therein, under rules and regulations to be prescribed by the said Board from time to time, a Museum of Natural History, by the American Museum of Natural History, incorporated by chapter one hundred and nineteen, laws of eighteen hundred and sixty-nine, or other institutions of a like character, at an aggregate cost not exceeding a sum of which the annual interest at the rate of interest at which a fund or stock shall be issued, is thirty-five thousand dollars for each of said buildings for the use of said corporations or other institutions of a like character; and it shall be the duty of and lawful for the Comptroller of the City of New York to create and issue in the manner in this Act provided, such additional amounts of a public fund or stock to be denominated the "Museums of Art and Natural History stock", as shall be necessary to provide the money required for erecting said buildings by an amount not exceeding the aforesaid limitations."

After several conferences with the Park Commissioners it was agreed, in accordance with the authority conferred in the foregoing law, that Manhatten Square, bordered by Eighth Avenue (Now named Central Park West), and Ninth Avenue (now called Columbus Avenue), and lying between Seventy-seventh and Eighty-first Streets should be reserved for the permanent location of our Museum of Natural History. This area of eighteen and a quarter acres was created by law a public square long before the great region of eight hundred and forty acres adjoining on its easterly side was taken for Central Park. Subse-

quently it was made by statute a part of the Park and placed under the Commissioners.

The first time I visited the square it seemed an almost hopeless task that we were undertaking to make this place accessible and attractive to the masses of our citizens. There was at that time only a single horse-car line on Eighth Avenue and the cars actually ran along just above the surface of the large pond in the square and of the little lake which still remains inside the Park at seventy-seventh Street.

Mr. Frederick Law Olmstead and Mr. Calvert Vaux, who laid out our unequalled Park, began to prepare plans for the improvement of the square so that it would be a suitable location for such a monumental and imposing structure as the museum building was designed to ultimately become.

It was sometime afterward when a route for the Elevated Railroad was planned along Ninth Avenue and a few pillars were scattered along it near where they were to be erected. When I learned that the elevated station was to be located at the Northwest corner of the square, I made an earnest but not successful effort to have it placed two blocks farther south, at seventy ninth street, so as to be nearer our first wing and immediately close to our future grand entrance on the west side of the square.

First, in order to prevent anyone from ever making the suggestion that our square should be cut in two by an easterly extension of Seventy-ninth Street from Columbus Avenue to the Transverse Road in the Park, that road was swung to the northward so that it opened out into the widened street on the northerly side of our square. A curving carriage road was also made from the same point, Eighty-first and Central Park West, to the Westerly Drive; and more important than

all a curving road led out from the Drive and a bridge was thrown over a small lake from the Park to Seventy-seventh street, at the southeast corner of the square. These two curving carriage roads between the Park and the Square were not built until the Trustees assumed the onerous task in 1881 of asking the Legislature to provide the means for carrying forward this necessary improvement, and they were reported as finished in our Report of 1882. Within the boundaries of our area the prospect was most desolate and forbidding. There was a high hill at the north east corner, of which a remnant still remains in the Park between eighty-first and eighty-second streets; and in the north west corner another hill of solid rock rose much higher than the Elevated Railroad station, which now stands in its place. In the southern and central part of the square, just where the first section of our building was to be erected, was a third hill, whose crest rose as high as the ceiling of our present Hall of Birds. As I sat on the top of this rock, the surrounding view was dreary and my only companions were scores of goats. Only the temporary shanties of squatters could be seen on the north, except two or three small and cheap houses half way between Eighth and Ninth Avenues, and which according to general belief, were erected there so that if an avenue should be cut through the blocks southwest to the north side of our square, these buildings would have to be taken down and the city would be expected to pay their owner a high price for the property. On the west were only shanties perched on the rough rocks, and south of us there was no building near, except the "Dacotah", a fine apartment hotel at the corner of Central Park West and seventy-second street.

Now, after the lapse of less than forty years, a majestic row of high and costly fire-proof apartment structures and fine churches extends along Central Park West from one-hundred-tenth street south

to sixty-fifth street. Next to the Museum on this avenue is the edifice of the New York Historical Society, while on the north side of our square is the building of the American Geographical Society, two appropriate and welcome neighbors.

To Mr. Calvert Vaux and Mr. J. Wrey Mould, who were at that time the architects of the Park Department, was entrusted the preparation of the plans for our Museum of Natural History. They cordially invited me to meet with them and bring the skeleton plan which I had partially matured before I sailed from Boston for the Orient in January, 1865. This simple sketch of the interior arrangement of a Museum of Natural History, I took with me as my constant companion throughout all my mourneys in the East Indian Archipelago, and also on all my travels in China except my perilous journey from Canton to Hankow. It also accompanied me to Japan and over Siberia to Moscow and St. Petersburg and via Berlin to London to which capital I had brought it after journeying nearly three years and more then forty thousand miles, in order to enjoy the privilege of showing it to Sir Richard Owen, the Superintendent of the Natural History Department of the British Museum and having an opportunity of seeking his criticism or commendation of its general design, so that on my return to New York, I should have a plan to present which would command the careful consideration of both the private gentlemen who might join our organisation and also secure the personal attention of the Commissioners of the Park. Sir Richard's comment was gratifyingly favorable and he gave the simple sketch a semi official approval.

This outline plan all originated from the form of a single case, which was of the T-shape of those now seen in our Halls of Birds and Invertebrate Fossils. The advantage of this form of exhibition case is that only its exterior structure is fixed and that it is well

adapted for mammals, such as deer with long antlers, and also when partitioned in the middle and provided with shelves it is equally suitable for exhibiting birds and other small objects as fossils. On the main floor of the Bird Hall we also pierced the walls and placed a ground glass window at the end of each case, so that every bird would have an abundance of direct light upon it from without, the condition in which its beautiful plumage is seen in nature. This method of placing the upright cases along the sides of a hall leaves its middle part open and unobstructed for desk cases and the impressive display of large single specimens. My original plan contemplatted two large halls, one over the other, and each provided with a gallery, like our present Bird Hall, but further study led us to adopt a design with only one hall of this kind, and to plan three halls with three entire floors. The width of each hall I proposed should be sixty feet and this measurement was adopted. Its length was to be one hundred and thirty feet, so that each wing with the transverse section adjoining, in which were located the stairways and opposite to them the rooms of the curators and with the parts of the building designed by the architects to connect the exhibition halls together exactly made up the space allotted in the general ground plan for ultimately occupying the whole square.

My own sketch suggested a building like that of the national capitol at Washington, namely, having a central dome with one wing extending northward and another like it stretching southward, and each of them ending in a proportion to transverse structure. But when we found such a large area assigned us, we extended these transverse structures into full-sized wings reaching the corners of the square.

The ground plan as thus enlarged contemplates a building with four equal sides, each about seven hundred forty feet long. At the

center of the square will rise a high tower dominating the entire structure. From this tower or central dome a wing will radiate to the middle of each of the four sides and thus divide the great square into four large open courts for lighting the interior sides of the exhibition halls.

As we wished to firmly locate our institution upon Manhattan Square at the very beginning and also to show from the first that our future edifice was ultimately to occupy its entire area, we decided to use our first appropriation in erecting one of the interior parts of the general scheme; and, therefore, we chose the wing radiating from the central tower or dome to the middle of the southern side as the first to be built, realising that both of its walls, must in time become only walls of interior courts. Of all the building-stones submitted to us for consideration, we all agreed that the most desirable for such an imposing and monumental edifice was a new red granite which came from the town of St. George in the province of New Brunswick, and I went down to St. John and made a personal examination of the quarries in order that we might be assured that there would be an ample supply obtainable during the very long period, which must elapse before the completion of such a great plan. The expense of cutting down the high hill of rock, where this first wing was to be placed, and of grading the surrounding area, proved to be so great, that we were obliged to defer using the selected red granite until we should begin to erect the exterior of the whole structure, but we felt assured that by that time a greater interest and pride on the part of the public in our institution would authorise the use of the more costly material, and this sanguine expectation has been fully realised.

In our Fourth Annual Report, issued in November 1872, our Board of Trustees record its great loss in the death of our President, John David Wolfe, who was one of the most genial and generous of all those public-spirited citizens who took an active part in the founding of our Museum. It was always a privilege to confer with him regarding our affairs. During the last interview he intimated to me that as soon as our negotiations with the Park Department, which were progressing most pleasantly, were concluded and the erection of the first wing actually begun, he would do something for our institution. The Trustees truly said "He entered with zeal into the project of this Museum of Natural History hoping and believing that it would prove an honor to his native city, and an important means of education to its citizens and their children. It owes its foundation in a large measure to his liberal aid and wise counsels, and whatever success may be in store for it, it will always count among its best treasures the name and character of its first President." Mr. Robert L. Stuart, our first Vice-President was unanimously chosen to be Mr. Wolfe's successor. Mr. Wolfe's death occurred while we were considering the desirability of securing the famous collection of shells gathered by Dr. John C. Jay and also his valuable library upon conchology. The great importance of such acquisitions is shown by the following statement by Doctor Jay of the extent and value of the property.

"My collection of shells comprises fourteen thousand species, twenty thousand varieties, and fifty thousand specimens, and has cost me many years of continued labor and over twenty-five thousand dollars. My library consists of eight hundred and fifty bound volumes, many of them obtained by giving unlimited orders, and is probably the most complete of its kind in America. It has cost me over ten thousand

dollars." This collection and library were presented to the Museum by Mr. Wolfe's daughter, Miss Catherine L. Wolfe, as "a gift to perpetuate the memory of one, who was its earliest President and one of its warmest friends."

This important addition, properly named by our Board the "Wolfe Memorial Gift" was received at the Arsenal and the shells were displayed in ten table cases, each four and one-half feet wide and sixteen feet long, and the library was placed in our work-rooms where it could be used at any time by original investigators in conchology. This was the beginning of our Museum library, which then only contained a single volume, a German edition of my "Travels in the East Indian Archipelago," published by Hermann Tostenoble, a firm in Jena, and given to the Museum, (as shown in my handwriting on its fly leaf) on November 16th 1869, when our institution had no habitation and only a legal name, and I was kindly provided by Mr. Anson Dodge, its first Secretary, with a desk in his office at 59 Wall Street. Now, in 1908, the Museum library contains volumes and expends five thousand dollars a year upon additions, besides ample provision for its care and administration.

The general ground plan for the whole Museum structure to be erected in course of time, and also the working plans for the first section, which were prepared by Messrs Vaux and Mould were approved by the Department and the Trustees, and the walls of the lower story of the first wing were already partly completed in the Spring of 1874. It was then decided to make the laying of the corner stone of this edifice, to be erected under the new plan of a cordial cooperation between the municipality and its citizens, a memorable occasion in the history of New York, and that, if possible, we would secure the

presence of the President of the Nation and of the Governor of the State, being assured, in advance, that the President of the Park Department would favor us with an appropriate address. I was, therefore, commissioned to go to Washington bearing a letter to General Grant and to arrange with him for a date that would suit his convenience. He heartily agreed with our view of the prospective importance of the occasion and promptly accepted our invitation and named the second of June as the date of his coming. General Dix also replied from Albany, expressing his pleasure in accepting our invitation and his purpose to be present. In the absence of Commissioner Salem H. Wales, Commissioner Henry G. Stebbins, read his address on behalf of the Park Department. Professor Joseph Henry, Secretary of the Smithsonian Institution was selected to favor us with an address, and expressed himself as happy to take part in the exercises.

To give our celebration a social character, the Trustees invited our guests, our city officials, and our contributors to take luncheon with them at the restaurant at Mount St. Vincent in the Park before the ceremony. We were favored with most beautiful weather and the Park was in its most attractive condition. Our route to the Square was down the east drive to the Mall and up the West Drive to seventy-seventh street; whence we proceeded over a temporary foot bridge to Eighth Avenue. As we came in view of the new building where many thousands from the city were already gathered, I could not refrain from expressing my delight at the sight and exclaimed "Well! it does seem as if all New York has come up to join in our celebration." As I was the marshall of the long procession, I walked at the head of the column beside our President, Mr. Stuart and General Grant, and when the General heard my words, he turned to me and nodded approv-

ingly, thus indicating that although he was accustomed to see large armies, he entirely sympathized with me in my gratified surprise. The whole programme passed off most successfully and the addresses are given in full on pages thirty four to fifty two of our Sixth Report. Mr. Stuart gave an historical sketch of the proceedings of our Board and included the following kindly paragraph relating to the part it had been my privilege to take in the early development of our institution. "In recalling, with pride, the progress that has already been made towards the realization of their plans, the Trustees desire to place on record their high appreciation of the services of Professor ALBERT S. BICKMORE, whose zealous devotion to the interests of the Institution and untiring industry in carrying out the wishes of the Executive Committee, have done so much to advance the prosperity of the Museum."

This opening ceremony occurred thirty-four years ago, and now in reading Professor Henry's address we find it interesting to note how closely we have unwittingly followed his advice and how fully we have already reaped the rich rewards he confidently predicted. After expressing his surprise at the extent of the collections we had already gathered, he said: "How incomparably greater would be the importance of this Museum, were there connected with it a professor, who at stated periods of the year, would give courses of free lectures on the objects it contains, who would expound the laws of the phenomena of nature, who would point out the operations of the mysterious principle called life, who would discourse upon the changes the world has undergone during geological periods, and who would reconstruct the history of man in primitive times from the remnants of his previous existence which have been gathered in this institu-

tion. There is still another duty which this city owes to itself and to the civilised world; I allude to an endowment for the support of a college of discoverers, of a series of men capable not only of expounding established truths but of interrogating nature and of discovering new facts, new phenomena, and new principles." At the conclusion of these ceremonies the Trustees gave to General Grant, the silver trowel, properly engraved, which he had used in laying our corner stone, as a suitable souvenir of this memorable occasion.

The improvement of our specimens in the Arsenal so as to make them in keeping with their future regal home in the new building was a great labor for our small corps, but we never hesitated to undertake any task that might render our exhibition more attractive and instructive, and we felt inspired and encouraged in our work by the highly appreciative remarks of our many visitors. The birds were taken from the dingy white stands on which they were mounted in Paris, and placed on others of more graceful form of mahogany, and their scientific labels carefully transferred and new ones in English added for the benefit of our public.

Our space for work-rooms was so limited that we improvised temporary ones in our exhibition halls by placing settees around us, and allowed all who came to our Museum to see our work in progress.

An important step in advance is noted by the President and Secretary of the Board in our Sixth Annual Report for the year 1874. It was the increase of the number of Annual Members from three hundred and fifty to eleven hundred in eleven months.

The imperative need of such a free public exhibition of our native birds, as were displayed in our halls, was strikingly manifested by the remarkable questions which were constantly asked us by

our interested but ignorant visitors. The rarest bird we possessed was the Great Auk, which was presented to the Museum in 1871 by our President at that time, Mr. Robert L. Stuart. It was frequently and widely mentioned by the public press. One man, apparently a farmer, came to me in an especially earnest manner and said he lived far from our city but that he had read of our Great Auk and that it was one of the things he had come to New York to see and he would thank me to show him where it was exhibited. I took him to the case and pointed out the specimen he had come so far to see. He looked at it for a moment and then turning to me with a grieved and disappointed expression on his face said "Why! it is no larger than a goose!"

We were always ready and happy to answer the many questions that came to us, especially those from our younger visitors for we hoped in this way we would be helping the youth of our city to become intelligent and thoughtful observers and our life-long friends. While we were thus pleasantly occupied, a specially courteous and prepossessing lad approached me one day and manifested the most genuine enthusiasm in the work we were privileged to do. He startled me with his thoughtful questions and at the same time charmed me with his comments on the privileges and delights of a naturalists life. I was completely captivated with his polite manners and his unusual mental power, and I thought of the remarkable promise of usefulness such a cultivated youth would possess if he should devote his great ability to the pursuit of our favorite science. I did not wait to ask his family name or for any other credential. It was enough for me, that he had the enthusiastic fire of a true naturalist in his eye, and his delicate touch showed that he was gifted with the sensitive organization of a student who is peculiarly adapted to a successful investigation of the beautiful mysteries of nature. If

later, we could as a part of our Museum work form a class for the study of natural history, then this youth who visited us frequently, would be my favorite pupil. While this charming dream was still in my imagination, the sad news came that this young man Frederick Sturges Osborn was drowned in the Hudson near his home in the Highlands opposite West Point. Afterward, an older brother, a graduate of Princeton, who had narrowly escaped with his own life in his efforts to save this young brother visited the museum. He had just returned from London where he had been pursuing his studies under Professor Huxley. He soon became our able curator of vertebrate paleontology, and in 1907 on the death of our late President and generous Benefactor, Mr. Jesup, it was the good fortune of our Board of Trustees to secure our unanimous choice, Doctor Henry Fairfield Osborn, as the successor to the honored office of President of our Institution.

The largest and most important single purchase which our institution has yet made was announced in our Seventh Annual Report, which was issued on December first 1875, when it was made known that the great Geological and Paleontological Collection of Professor James Hall of Albany had been secured for our Museum. It was the largest and most complete assemblage of invertebrate fossils which has ever been made in America. These specimens had been gathered not only from all the formations of New York State which have given their names to the rocks of several other commonwealths but also from the strata of our Western States, hence our Trustees could properly say that it was a matter of just pride with us to secure against the intelligent and liberal competition of foreign scientific bodies, the interesting and authentic examples of a geological work so extensive and important; especially as these specimens would remain the perpetual record of a scientific enterprise made under the authority of the State of New York, and extending over a period of forty years, and undertaken when the science of Geology had scarcely a name, and no place or position in this country.

The price paid for this great collection, which was a museum in itself in the department of geology, was Sixty-five thousand dollars, of which Forty thousand dollars was subscribed by our Board of Trustees alone, and they also made up the remaining balance with but little aid from other citizens.

The packing and shipping of this great property was for our limited corps a large undertaking but at the same time a most enjoyable labor; because all the finest specimens from the older formations which had been figured and described with scientific accuracy in the Natural History of New York passed through our hands and we had the privilege of making, as it were, the personal acquaintance

of those rare forms of life, which had been only known to us before by the figures of them found in paleontological works. We were, indeed, passing in review the progress of life on the shores of our ancient continent from the earliest dawn of Eozoon Time down to our own age, when man appeared on our planet and human history began.

Doctor Holder and his son and myself went up to Albany to carry out this labor under Professor Hall's direction. There was also with us a young and enthusiastic student from Hoboken, who eagerly improved my invitation to accompany us as a general assistant. He was very industrious and obedient, and always ready to make himself useful in handling the specimens and acting as our caterer. His ability and untiring energy have since caused his name to be well known among the jewellers of the commercial world as Dr. George F. Kunz, the gem-expert of Messrs Tiffany and Co. of this city and our present Honorary Curator of Gems. A notable work, which he has edited, is the description of the great collection of Jades, which was made and presented to the Metropolitan Museum of Art by Mr. H. R. Bishop and which is worthily famous for its unique excellence.

Professor Hall placed us in possession of the little museum building, which he had specially erected to keep his treasures as carefully guarded as possible from the danger of fire. In one part of this structure was his laboratory where drawings were made of the uniquely perfect specimens, and he wrote out descriptions of them and edited his large series of scientific papers. We encamped in the midst of this exhibition hall, placing our cots in the alcoves, while above us on the tops of the cases were huge fragments of ante-diluvian monsters, a grim assemblage that kept watch and ward over us, and were constantly glaring down on us from sightless eyeballs. In subsequent years Dr. Holder used to entertain our guests, the

curators of other Museums, with a picturesque description of the weird scene that greeted his astonished gaze in the early dawn of our first morning when we seemed to have left the everyday experience of our modern world and to have been taken back into the distant geologic past when huge reptiles held possession of our planet.

Our work consisted in placing before Professor Hall drawers filled with the specimens of each formation, so that he could give each specimen the benefit of his authentic identification. They were then packed in new, uniform boxes which were carefully numbered and a catalogue of the contents of each fully recorded so that any single specimen could be unpacked at our Museum, whenever it was particular desired. This whole property was shipped to the new building where it was carefully stored, while we made an application for Two-hundred thousand dollars more for suitably equipping and furnishing our fire-proof edifice. To obtain this second sum promised for a time to be as difficult as it had been to get the first half million for our building but Mr. H. A. Witthaus took me to see his personal friend, Comptroller John Kelly, whose favor we secured and an appropriation by the legislature of the desired sum promptly followed, as a matter of course.

We were very fortunate in obtaining for the curator of this great department of our institution Professor R. P. Whitfield, who had been for many years Professor Hall's principal assistant, and who was already, at that time, an eminent authority in paleontology. He has been with us now for over thirty years and has always been the same methodical and devoted student, adding dignity, ability and geniality to our able corps of original investigators. His first work in the Museum was to place this great collection on systematic exhibition and to illustrate by a series of elaborate manuscript

maps the areas from which the specimens of each geologic age had been gathered. Such a careful selection showed that the types and figured specimens number about and that those added to illustrate geographical distribution brings up the total number of specimens now displayed in our cases from the James Hall Collection to about one hundred thousand----a monumental series and one worthy of being considered as one of the principal corner stones of our great Museum.

The Centennial Exposition at Philadelphia in 1876 was a favorable opportunity for obtaining much material illustrating the natural resources of many lands. The owners of numerous exhibits of mineral ores, including those of coal and iron, and of ornamental and building stones and also native woods, were very happy to give us a large part of their specimens for exhibition in the Arsenal Building on Central Park in New York, after their season's display in Philadelphia. Jamaica gave us its entire exhibit and a large series of specimens was gathered from the other West India Islands and from most of the States of our Union.

The soliciting and shipping of this Centennial property, while we were at the same time preparing our zoological collections for the opening and inauguration of our new building, caused us to take on, temporarily, several new assistants. Among these was a young man, Mr. Louis P. Gratacap, who had graduated from the Free Academy, now the great City College on Morningside Heights, and from the School of Mines, Columbia College. His intense earnestness, transparent integrity and complete devotion to our science and his marked ability made him a particularly valuable assistant in the Department of Mineralogy, of which he is now our able Curator, having proved his worth by a continuous service with us for over thirty years.

The progress made in the construction of our new building by the Park Department and in the arrangement of our collections by the Museum corps were so satisfactory, that in three years and a half from the laying of the Corner Stone we were ready to invite all our friends to attend on December 22nd 1877 an opening of our new home and enjoy a view of the treasures in natural history which the Museum had already gathered in the eight years and a half that had elapsed since it received its Charter from the State Legislature.

The exercises were, a prayer by Rev. William Adams, D. D., and addresses by the President of the Museum, Mr. Robert L. Stuart, the President of the Park Department, Mr. William R. Martin, and by Dr. Charles W. Elliot, President of Harvard College, and Professor O. C. Marsh, President of the American Association for the Advancement of Science. Mr. Stuart gave an account of the growth of the Museum up to that date, and Mr. Martin, representing the city, described the construction of our building, which had been erected by his Department of Public Parks. President Elliot's thoughtful address is as fresh and timely now, as it was when delivered in his eloquent words and with his graceful manner, thirty one years ago, as these extracts will show.

"In whose honor are the chief personages of the nation, state and city, here assembled? Whose palace is this? What divinity is worshipped in this place? We are assembled here to own with gratitude the beneficient power of natural science; to praise and thank its votaries, and to dedicate this splendid structure to its service. The power to which we here do homage is the accumulated intelligence of our race applied generation after generation to the study of Nature; and this palace is the storehouse of the elaborated materials which that intelligence has garnered, ordered, and illuminated. What has

natural science done for mankind that it should be thus honored?

In the first place, natural science has engendered a peculiar kind of human mind--the searching, open, humble mind, which, knowing that it cannot attain unto all truth, or even to much new truth, is yet patiently and enthusiastically devoted to the pursuit of such little new truth as is within its grasp, having no other end, than to learn, prizing above all things accuracy, thoroughness and candor in research, proud and happy not in its own single strength but in the might of that host of students, whose past conquests make up the wondrous sum of present knowledge, whose sure future triumphs each humblest worker in imagination shares. Within the last four hundred years this typical scientific mind has gradually come to be the kind of philosophic mind most admired by the educated class; indeed, it has come to be the only kind of mind, except the poetic, which commands the respect of scholars, whatever their department of learning. In every field of study, in history, philology, philosophy, and theology, as well as in natural history, and physics, it is now the scientific spirit, the scientific method that prevails."

"It is an achievement which has much to do with the modern increase of liberty in human society, liberty individual, political and religious; it is an achievement of the highest promise for the future of the race."

"The second result which I wish to specify is the stupendous doctrine of hereditary transmission. x x x As the knowledge of heredity, recently acquired by science, permeates society, it will profoundly affect social customs, public legislation, and governmental action. It will throw additional safeguards around the domestic relations; enhance the natural interest in vigorous family stocks; guide wisely the charitable action of the community; give a rational

basis for penal legislation; and promote both the occasional production of illustrious men and the gradual improvement of the masses of mankind. These moral benefits will surely flow from our generation's study of heredity."

"Finally, modern science has discovered and set forth the magnificent idea of the continuity of creation. It has proved that the development of the universe has been a progress from good to better, a progress not without reactions and catastrophes, but still a benign advance toward ever higher forms of life with even greater capacities for ever finer enjoyments. It has laid a firm foundation for man's instinctive faith in his own future. From the sight and touch of what the eternal past has wrought, it deduces a sure trust in what the eternal future has in store. It has thus exalted the ideaof God -- the greatest service that can be rendered to humanity. 'Each age must worship its own thought of God', and each age may be judged by the worthiness of that thought. In displaying the uniform, continuous action of unrepenting Nature in its march from good to better, science has inevitably directed the attention of men to the most glorious attributes of that Divine intelligence which acts through Nature with the patience of eternity and the fixity of all-foreseeing wisdom. Verily, the infinite, present Creator is worshipped in this place. A hundred life-times ago a Hebrew seer gave utterance to one of the grandest thoughts that ever mind of man conceived, but applied it only to his own little nation, and coupled it with barbarous denunciation of that nation's enemies. This thought, tender and consoling toward human weakness and insignificance as a mother's embrace, but sublime also as the starry heights and majestic as the onward sweep of ages, science utters as the sum of all its searching

and its mediation, and applies alike to the whole universe and to its least atom---!"the eternal God is thy refuge, and underneath are the everlasting arms!".

Professor Marsh spoke on the confident trust of the scientific men of our land that our new institution would soon come to enjoy a world-wide renown not only for the attractive and instructive exhibitions in its public halls but also for the extent and value of the original researches carried on by its scientific staff--a hope which has since been more than realized, especially in our present Department of Vertebrate Palaeontology, which under President Osborn is not only continuing the researches of Doctor Leidy and Professor Cope of Philadelphia and of Professor Marsh of Yale, but is developing them upon a higher and superior plane of skilful elaboration and beautiful illustration.

Upon the conclusion of Professor Marsh's address, President Rutherford B. Hayes declared our new building open to all citizens of all lands.

Three years after our opening, the Museum experienced a serious loss in the death of the Chairman of its Executive Committee, Mr. W. A. Haines on March 5th 1880. The official minute entered by the Trustees, which was probably drawn by his life-long friend Mr. D. Jackson Steward, at that time Secretary of our Board, appropriately states: "He was not only the sound and judicious adviser and the energetic man of business, but much more. There was about him a quality of refinement united to singular purity, and a temper in which decision and sweetnesswere remarkably combined."

The next year, Mr. Stuart found his health failing so seriously that at the Quarterly Meeting of the Trustees held on the 14th of

February, he asked to be relieved of the duties of President of the Board, and on the 14th of the following December 1882, the Trustees held a special meeting to adopt resolutions regarding his death and the high estimate of his character.

"Resolved, That in view of the loss of one who has proved himself so strong and reliable a friend of its interests, it becomes this Board to recognize the event with appropriate expressions of its unfeigned sorrow. x x x x x x x x Mr. Stuart had a large share in the promotion of the prosperity of the Museum from its origin. X x x x x x His contributions to its cabinets and treasury were worthy of his reputation and character as a public benefactor. x x x x x He was loyal to the cause of humanity and a conspicuous example of that which by common consent entitles the memory of men to a place of high honor."

Upon the death of Mr. W. A. Haines, Mr. Morris K. Jesup, whose name was second on the list of members of the Executive Committee, was elected its Chairman, and when the resignation of Mr. Stuart as President was accepted by the Trustees, Mr. Jesup was unanimously chosen to succeed him, and was reelected at every annual meeting until his death on the 22nd of January 1907, after a continuous and able service of nearly twenty-seven years.

The next day after our grandly successful opening we experienced the depressing effect of finding our spacious exhibition halls nearly deserted. We were evidently doomed now for a number of years to experience the unfavorable effect of our isolated position as compared to our former location in the old Arsenal, near the main entrance to Central Park, and where we were readily accessible to all our friends. But we knew that the Elevated Railroad would soon come up Columbus Avenue to our Square, and after a long period of waiting

encouraging rumors finally came that the main artery of the present subway system would pass near us under the Boulevard on its way from the Battery to the Northern extremity of Manhattan Island.

During this period of isolation it would evidently be necessary for us to put forth specially energetic efforts to maintain the popular prestige which had hitherto attended our labors. While contemplating this serious problem it naturally occurred to me to enquire, what new fields of usefulness our institution could be made to occupy, and the first thought that occurred to me was to ascertain how we might assume an attractive and helpful part in promoting the education of our youth by cooperating with the teachers of our free public schools, one of the principal purposes we had in view in forming our organization as distinctly set forth in our charter.

I sought the acquaintance and important cooperation of Hon. Stephen A. Walker, President of the Board of Education, of Hon. William Wood a prominent member of that Board, of Mr. John Jasper, City Superintendent of Schools, and of Dr. Thomas Hunter, President of the Normal College, who all joined me with a personal zeal in seeking to find a practical solution of this new and difficult problem.

When Mr. Jesup was made Chairman of our Executive Committee, I immediately acquainted him fully of the unfavorable effects we had already experienced from our isolated situation during the three years since our "Opening" and that a possible solution of our embarrassment had occurred to me by our undertaking a new and wider field of usefulness in connection with our free public schools and of the cordial reception that awaited any communication which we should deem it advisable to present. He entered heartily into the suggestion and desired me to prepare a letter which I did in the following manner and of which the original press-copy in my handwriting is

still preserved in the records of the Museum.

His signature of this letter was Mr. Jesup's first act as an officer of the Museum.

"American Museum of Natural History,
Central Park, New York City.
November 30, 1880.

Hon. Stephen A. Walker,
President of the Board of Education.

Sir:

The Trustees of this Museum having acquired large and costly collections of Mammals, Birds and specimens illustrating the Ethnology and Geology of our own and other lands, and having placed the same on public exhibition in their Museum on Manhattan Square, desire that their valuable property may be of service to your Board in educating the youth of our City. They would therefore be happy to meet a committee appointed by your Board to confer upon the best method of thus promoting this public good.

Very truly yours,

(Signed) MORRIS K. JESUP,
Chairman of Executive Committee."

This communication was referred by the Board to its Committee on Course of Study, who immediately called at the Museum and stated their high appreciation of our desire to aid them to increase the efficiency of their school system. They confirmed what I had previously been informed, namely that mandatory laws existed on the statute books of the State requiring all the children of our Commonwealth to be taught what were then called language lessons, upon the materials for building, clothing and food, and concerning animals and plants, and they

added that no instruction had been given concerning animals because no means existed by which the teachers could obtain the information, which the mandatory laws required them to communicate to their pupils. Hence, if our Museum could enable their Board to fulfil the requirements of the existing statutes we would be rendering every family that had a child in the public schools an important and direct benefit, which would be fully appreciated by all parents.

As none of our curators had ever enjoyed the privilege of giving instruction for any considerable time, it only remained for me to humbly offer to try to give the desired information myself, and as the plan proposed would be essentially new, I suggested that we move forward as cautiously and inconspicuously as possible, so that if we were not successful, our failure would not attract serious attention.

I suggested as an experiment that if the Board would invite thirty of their teachers to come to the Museum, I would cheerfully make the attempt to give them some elementary information in six lectures concerning the animals on exhibition in our halls, in such simple language that my words might be repeated by the teachers to their classes. The Committee said that those teachers, who should come, would have to volunteer to do so on Saturday out of their own time and after they had finished the work for which they were paid by the city. We all agreed that this plan could be easily adjusted for it would involve no expense to the Board and none to the teachers except their fare to and from our building, and I expressed myself as heartily happy to undertake this additional service, without further recompense than the pleasure of hoping to render our institution of increased influence in promoting free public education.

The Committee on Course of Study and School Books, as the result

of our conference, made the following report to their Board:

That in the judgment of the Committee, the proposal of the American Museum of Natural History to make its admirable collection available for the Educational System of New York, deserves the acknowledgment of this Board.

That the Committee believe that the children of the Public Schools should be encouraged to visit the Museum at such time as they may have at their disposal, being convinced that even the immature or ulcultivated minds of children receive most fruitful impressions from even a cursory and superficial acquaintance with the objects presented and arranged in such collections.

The arrangement of the course of studies for the schools would not permit any disposition by which the children could be allowed or encouraged to frequent the Museum on school days, and it is believed that such is not the purpose of the communication of the Executive Committee of the American Museum of Natural History.

That the very simple elements of Natural Science taught in the Public Schools, are imparted, almost entirely, in accordance with the requirements of the course of study, by oral instruction, and that but little time is allowed to them. Your Committee, while not recommending any increase in the amount of instruction in Natural Science or in the time devoted to it, are of the opinion that the existing requirements of the by-laws, in this particular, should be fully complied with. For this purpose the teachers themselves should be thoroughly instructed in the branches in question.

Oral instruction especially requires, on the part of the teacher, a thorough familiarity with the subject.

The proposal of the Executive Committee of the American Museum of Natural History, it is understood, embraces a plan of colloquial

lectures, to be delivered on any day that may be selected, to a class numbering about twenty-five or thirty, the course to consist of not less than six lectures. Your Committee believe that such a class could readily be formed by voluntary action among the teachers, directed by the City Superintendent, Saturday being the day selected for the lectures, when the school work would not be interfered with. The creditable ambition displayed by the teachers who would embrace this opportunity of improvement would result greatly to their own advantage, as well as to that of the children falling under their instruction. It may be stated that the Professors of the Normal College have visited the Museum with their pupils, and profitably used the collection for illustration of their own lectures.

The Committee submit the following resolutions:

RESOLVED, That the City Superintendent be instructed to issue a circular calling attention to the collections of the American Museum of Natural History, as an educational feature, and the desirability of its being visited on Saturdays and holidays by teachers and pupils; and that he also be requested to select a classof teachers who will volunteer to attend a course of free lectures on Saturdays, to be delivered through the courtesy of the Executive Committee of the American Museum of Natural History.

RESOLVED, That a copy of the above report and resolution be transmitted to the Executive Committee of the American Museum of Natural History.

December 23, 1880.

The Resolutions recommended by the Committee were unanimously adopted by the Board and the City Superintendent issued the following circular:

Hall of the Board of Education,
City Superintendent's Office,
November 11th, 1881.

To the Principals and Teachers:

In accordance with a resolution of the Board of Education, and upon the recommendation of the Committee on Study and School Books, the undersigned hereby directs the attention of all teachers to the fact that the American Museum of Natural History, possessing a large and costly collection of specimens, illustrative and useful in many departments of science, is now complete, and open to the general public for visitation and inspection. The Trustees of this Museum, through the President of their Board, Mr. Morris K. Jesup, have specially extended an invitation to the teachers and scholars of the public schools, in which invitation the desire is expressed that the Museum may be utilized in the service of public education.

The undersigned, therefore, suggests and advises that the means of assistance in prosecuting the study of natural science, thus courteously and definitely placed at the disposal of the schools, be rendered as available for the purpose mentioned and made as practically useful as circumstances will permit.

By frequent reference to the existence of the Museum and its many treasures in the Department of Natural History, the Principals and Teachers could and should awaken theinterest of the children, and by precept and example, could induce and encourage them to take advantage of the opportunity thus presented. The fact that teachers from the several schools have travelled great distances in inclement weather to attend a course of Saturday lectures at the Museum, and were amply rewarded for their time and effort, is proof of the Museum's usefulness from an educational point of view; and an announce-

ment of what had been done and is going to be done by teachers, would necessarily be productive of great effect upon the minds of the pupils. The elements of Natural Science, taught orally in our schools, are best presented by those who have an objective acquaintance with that about which they speak and lecture, and the pupil who can pass from the world of books and oral statements into actual contact with the very things of which the books and statements give only imperfect pictures, is in possession of advantages which it would be inexcusable to neglect.

Teachers and Pupils should, therefore, on Saturdays and holidays, devote some portion of their time to the Museum and its collections.

Good instruction makes discipline easy. A visit by the meritorious pupils of the class, in company with the teacher, as a reward for satisfactory service during the week or month, wouldnot only increase the pupil's knowledge, but also constitute an effective agency in securing order, interest and attention in the class room, and would thus make the teacher's labor less arduous and exhausting.

The Museum of Natural History is in Seventy-seventh Street, between Eighth and Ninth Avenues. It opens every day, except Sunday, at nine o'clock A.M. and closes half an hour before sunset.

Very respectfully,

(Signed) JOHN JASPER,

City Superintendent.

For the subject of the first lecture, I chose "Corals and Coral Islands", so that we might commence our studies with the lower and simpler forms of animal life, and also because it was probable that several teachers who would be present had already read my "TRavels in the East Indian Archipelago" and therefore they might be interested to hear me repeat some statements made in that book regarding the

wondrous beauty of those tropical islands and the surprising purity and clearness of its sparkling seas.

A few fine specimens of corals were taken from our exhibition cases, and to illustrate the anatomical structure of the living animals, Mr. Gratacap helped me exhibit the plates of a finely-colored edition of Cuvier's "Animal Kingdom". These illustrations were shown on a transparent screen through a door from an adjoining room, and the size of the screen was limited by the width of the door to two feet and a half square. For a long time I kept a model of this single miniature screen to show when we reviewed the history of our system; until twenty years later we occupied our present large auditorium, where the two screens are each twenty-five feet square inside the frame of the picture.

The weather, on the opening day of this new method for promoting free public education by illustrated lectures, was the most unfavorable of any during the whole of that winter. On the nightprevious a severe sleet storm had covered the whole upper part of Manhattan Island with a coating of ice, making it as smooth as if it were covered with glass, and the approach to the Museum from the Elevated Railroad station at 81st Street and Ninth Avenue was positively dangerous.

At the appointed hour I went up from my office by the small elevator, now used only for freight, to the work-room under the Mansard roof, which had been selected for our first lecture hall. I can hardly describe my surprise and my gratification, when I entered the little room and found that out of thirty teachers who had been invited, no less than twenty-five had come through the heavy storm. There were also present to represent the Board of Education, Hon. William Wood, Superintendent Jasper, and President Hunter of the

Normal College, so that my first audience consisted of exactly twenty eight persons.

My audience and myself were so absorbed in our subject that we did not realize how pitifully inadequate our crude apparatus was for properly illustrating the delicate anatomy of the coral animals and the scenery of the beautiful islands of "India's sunny seas".

As my auditors were so few, I gave the lecture in an informal and conversational manner, and at its close I invited the teachers to ask questions regarding matters I had not fully explained. The earnest inquiries that promptly followed startled me, for they showed that though I had a small audience, it must have been selected by Mr. Jasper from a large number of teachers for their questions indicated an unexpected familiarity with the subject, which had been previously announced. They also manifested a remarkable appreciation of the rich variety and beauty of the large collection of corals on exhibition in our halls.

The subjects of the five following lectures were other interesting groups of marine life. Then the teachers expressed their hearty thanks for the information they had received, and asked me to continue in the same manner for six lectures more.

At the close of the course originally proposed I reported my experience in this new department of museum work to our President and Executive Committee, and added "we have been seeking a wide field of usefulness. We now have a most important one thrust upon us. Shall we welcome the request of the teachers with a favorable reply, and hopefully wait to see what may ultimately develop from this humble beginning?" It was readily agreed that we must by all means carry out the wishes of the teachers, as fully as possible, and that any additional apparatus that I might need, the Museum would promptly

supply, and I stated that to make our instruction most effectual we should adopt a visual method, and to accomplish that end I needed the aid of a photographer and a stereopticon, so that we might exhibit slides of the longer mammals, which could not be transferred from our cases to the little lecture room, and after the session was over, I could then take my class down to our exhibition halls where the teachers would see the specimens which they had just heard described, and which they could subsequently show to their pupils. In this way the Museum would become an attractive and effective part of the public school system of our metropolis.

The second series of six lectures were as largely and constantly attended as the first series and at their conclusion the teachers asked for a third series of six more, so that our First Course finally consisted of eighteen sessions, the interest of the auditors apparently increasing as the subjects of the lectures were unfolded. From that date to my last lecture, a period of over twenty years, I never lacked for a large and appreciative audience, and one which for the last nine years filled our great auditorium four times full to hear each different subject which it was my privilege to present.

The Board Of Education sent to the Museum a note expressing their gratification at the result already attained and asked for a second course to be given during the next season to fifty teachers; and at the close of that series another note for another course for a hundred teachers; and again at the end of that series another note for other lectures for a hundred and fifty teachers. Soon after thelast communication was received from the Board of Education, Mr. Jasper sent the following letter to President Jesup, containing a summary record of our work to date.

City Superintendent's Office,
Board of Education,
No. 146 Grand Street, New York,
February 12th 1883.

My dear Sir:

The following is an extract from my annual report for the year 1882, which will soon be ready for publication:

"It seems proper to state that the lectures delivered by Professor ALBERT S. BICKMORE, at the Museum of Natural History, have been productive of very good results in this department of study. These lectures, introduced about three years ago, as an experiment, have so grown in attractiveness and utility, that the class of twenty-five teachers has become one hundred and fifty, representing every Grammar Department in the system, and irregularity in attendance has almost disappeared. The Museum of Natural History thus, through the teachers, reaches the pupils of our schools, and through the latter making itself felt in nearly every household of our great city, is demonstrating its usefulness to the community at large. To MORRIS K. JESUP, Esq., Chairman of the Committee in charge of the Museum, and to the other members of the Committee, great credit is due for the commendable public spirit which they have displayed in this matter from the very beginning, and to Professor BICKMORE, who has so ably interpreted and carried out the Committee's views, the thanks of the teachers are due for the patience, ability and kindness he has shown!

Very truly,

(Signed) JOHN JASPER,

City Superintendent."

Morris K. Jesup, Esq.

To provide for these larger audiences, the Trustees of the Museum, at their own expense, had the partition between the work-room first occupied and the one adjoining, removed and replaced by a new structure forming the whole space into one little hall. While our work was thus steadily developing, near the close of one of the school years, President Hunter came one day to the door of my office, which I always left partly open so that any visitor to the Museum, friend or stranger, who cared to do so, could speak to me at any time, without delay. I said to him "Come in, Doctor, come in, your cheerful manner always makes your presence most welcome. I hope as I am honored with this visit at an unusual hour, that you bring some specially good news."

He said, "Professor, I have come here directly from the Board of Education, (then at the corner of Elm and Grand Streets) where Mr. Jasper and I have been holding an important conference. You know that at this time of the year, examinations are made of the various classes in the public schools by officials of our Board, and that these reports are forwarded to the City Superintendent, and that our custom is that teachers shall be advanced to higher positions in accordance with these statements which show the efficiency of the work they are doing for the city. I know personally nearly every teacher who attends your lectures and Mr. Jasper and I have been reading the reports of the examinations of the classes under these teachers, and this is the important result that we have learned and which I have hastened to come up here to repeat to you, namely that these classes stand so much and so much percent higher than the classes which have been studying the same subjects under other teachers who have not been under your ~~xxxxx~~ instruction and so much and

so much per cent higher than their previous classes ever did before your lectures began." I said, "Doctor, your remarkable statement is indeed most gratifying. It more than repays me for my labor and my personal expenditure." He continued by saying, "May I ask a question?" "Certainly, Doctor." "Do you easily find abundant means for carrying on this lecture system?" "I do, but in this remarkable way. Soon after I had finished my first course of lectures, Mr. James M. Constable, who is Chairman of our Executive Committee sent for me to call at his office. He said to me 'Professor, how do you prosper in your lectures to the teachers', and I replied the teachers are constant in their attendance and express increasing interest in our instruction. He said 'Your work, Professor, has proved most important--just as I was confident it would be when you first began. But how about your necessary expenses?' Oh! I pay them all myself out of my own salary. 'I hope your enthusiasm does not lead you into debt'. Not by any means. What I do not have the money to pay for, I go without. "Well now, Professor, when your means are exhausted, I want you to come down here and tell me plainly how much you need to properly continue the system, and I will be more than happy to give you a check for that amount, and I will give that sum in addition to the amount which I regularly subscribe for the Museum, so that no one may think for a moment that any money comes from the institution to carry on this peculiar work.' And this is the way the system is now carried on." Doctor Hunter continued, "It proves to be as I had anticipated, Professor, you do all this extra work and pay most of the bills yourself. Now it is high time the city or the state should make your system permanent and amply compensate you. Mr. Jasper and I agree that you are doing a "Normal" work both in the meaning and in the letter of the law. There are, as you may already know, eight

Normal Schools maintained by the State, at an annual expense of eighteen thousand dollars each, and of this sum of one hundred and forty-four thousand dollars New York City pays into the State treasury nearly one half, and yet the nearest State Normal School is the one at Albany. Now we, the City Normal College, have been urged repeatedly to ask the Legislature for a like sum of eighteen thousand dollars, but we have never done so, and do not expect that we ever shall, and instead we have been keeping our right to receiving this amount an office secret among ourselves with the hope that some other agency for giving public instruction might in the course of time appear in our midst which would prove worthy of such State aid. Therefore, Professor, I have come up to state to you these facts and to say that if you will go to Albany and try to get this appropriation we will give you our right to it, and our blessing that you may succeed in obtaining it!"

Then I said, "Doctor Hunter, I have heard of a man's being struck by a bolt of lightning from out a clear sky, but this is, I believe, the first time that such an experience ever came to me. In reply I wish to say first that I have no words to adequately express to you my gratitude for the noble and kindly spirit that has brought you to our Museum to communicate such welcome intelligence and make such a generous offer, and also to add that when I relate to our Trustees this conference, they will express the same high appreciation of your important and generous cooperation, so politely conveyed to us."

Our helpful friends also appeared. Hon. Alexander McL. Agnew, who had been prominently connected with many important benevolent institutions came to our little hall, and expressed his belief that our illustrative method of teaching would soon be widely accepted.

When he learned of the endorsement and proposition of President Hunter, he said he would bring an important helper, his friend, Hon. Erastus Brooks, then Chairman of the Ways and Means Committee of the Assembly, whose influence would be of paramount importance in placing such an item in the next Supply Bill. Mr. Brooks attended many of our lectures and fully endorsed the prospective value of our system. He also introduced me to Hon. William B. Ruggles, who had recently become the State Superintendent of Public Instruction.

To afford a favorable opportunity for a conference of all these helpful friends, President Jesup invited them to dine with him and our Executive Committee at his residence. Judge Ruggles came down from Albany, and Mr. Jasper and Dr. Hunter represented the City Board of Education. After a thorough consideration of the subject, Mr. Jasper and I prepared the draft of an item for the Annual Supply Bill then being drawn up in the Assembly.

This item did not provide for the whole sum of eighteen thousand dollars to which our part of the State was in equity entitled but only twelve thousand dollars for some of our Trustees said nt to me "But Professor what would you do with such a great sum, for up to this time you have had only what Mr. Constable and you yourself have given for this special purpose." And I said we can, in my judgment, use the whole sum with great benefit to our city schools in this way. If we had the means to place a small cabinet in each Grammar School, containing small specimens of the coral and of many of the other animals described in our First Course, then each teacher who was present could use such specimens when she repeated our lecture to her pupils and could conclude her instruction with an invitation to her class to accompany her on the following Saturday or on the next holiday to the Museum where they would see all the interesting corals

on exhibition in our public halls.

I also suggested that it would probably be easier to obtain from the Legislature the same amount that was given to each Normal School, than any other figure, but I yielded to the advice of my Board and hence the smaller sum which was named in this draft.

With this paper I appeared before the Committee of Ways and Means and Judge Ruggles accompanied me and heartily supported our cause, and Mr. Brooks as Chairman of the Committee described his personal examination of our work and its results and gave our plan his hearty endorsement.

Our item was then formally adopted and placed in the bill which was promptly passed by both branches of the Legislature.

Mr. Ruggles, as State Superintendent of Public Instruction, and Mr. Brooks as Chairman of the Committee which made up the Supply Bill, took me into the Executive Chamber and introduced me to Governor Cleveland, and I briefly explained to him the history and purpose of the new item, and I understood him to intimate that if he should come to entertain any doubt about approving the measure, he would grant me a further hearing. As no such notice came, I considered the item safe, but when the bill was filed in the office of the Secretary of State, it was found that our appropriation had not been approved. I was greatly disappointed but only the more than ever determined to keep on trying until finally we did succeed, for I knew that if my lectures continued to prove as useful as they had been to the teachers and pupils of our metropolis, which was annually paying into the State Treasury forty-seven per cent of the one hundred and forty-four thousand dollars paid out yearly for the

support of the eight State Normal Schools, we should ultimately obtain the comparatively small sum of eighteen thousand dollars. Meantime an encouraging communication came from a new source, Dr. E. A. Sheldon of Oswego, Chairman of the Council of Principals of the State Normal Schools wrote me stating that the Council had heard with interest of my efforts by means of illustrated lectures to enable the teachers of our city to fulfil the mandatory statutes requiring instructions to be given in the free public schools of the state upon animals. This letter also announced that an annual meeting of the Council was soon to be held at the State Normal School at Brockport, and gave me an earnest invitation to meet the Principals and deliver before them to the pupils of the school composed of those who were studying to become teachers, such a lecture as I had been giving at our Museum of Natural History. I accepted the invitation and went at my own expense taking with me Mr. L. C. Leudy, who was doing photographic work for me and was an experienced operator of the stereopticon. I gave the lecture and the members of the Council expressed their hearty approval of my method and their anxiety to adopt it although their pupils could not have the advantage which our city teachers enjoyed of a frequent visit to our Museum. General T. J. Morgan, then Principal of the State Normal School at Potsdam took an especial interest in this newly proposed addition to their previous course of instruction.

The Principals asked how they could obtain copies of our slides and I said that it was the wish of our Museum to be useful not only to the teachers of New York City, but to those of our whole State and indeed ultimately to those throughout our whole Republic. I would therefore propose that if we could have the justice done us of receiving an appropriation from the next legislature, if the City Board of Education did not object, we would undertake ~~the~~ to aid them

from our fund. Meantime each of them could have the opportunity of explaining to his Senator and Assemblymen the personal interest of his school in the success of our next application for state aid. Our city Board approved of my plan.

Soon after I was pleasantly surprised with a request from Hon. David Lamont, then the Secretary of Governor Cleveland, desiring me to meet me and I appointed an early date for a conference at the old Delavan House. He said that the Governor would be happy to see me "up on the hill", but I preferred to thus confer confidentially with his private secretary who was well known to be the Governor's wisest adviser. I explained to the Colonel how the teachers of our City felt that an injustice had been done to them by the Governor's veto, and how we could introduce a slightly different measure next winter making the State Normal Schools, at their request, participants of our fund. The Colonel expressed his personal interest in our labors to aid the cause of free public education and gave me important advice as to who would be the best men of the Governor's many friends to explain to him our work and he particularly named for that purpose Senator James H. Robb, who has since become one of our Trustees and is now the Secretary of our Board. Mr. Robb acted as sponsor for our bills in the Senate and Hon. Walter Howe gave us similar aid in the Assembly as long as they were members of the legislature.

With Hon. William B. Ruggles, the Superintendent of Public Instruction, we again entered the Executive Chamber, and explained our desired legislation and Governor Cleveland's reply was "Well I am not a "Bourbon" who having once said No, will refuse to reconsider a former decision when fuller information regarding the matter is kindly given me."

The item, which we presented was drawn by Superintendent Ruggles, who gave our work his cordial endorsement in the following words in

his official report dated , which is the first time the Department of Public Instruction of the Museum is mentioned in the official documents of the State.

AMERICAN MUSEUM OF NATURAL HISTORY.

The last Legislature authorized the State Superintendent of Public Instruction to establish and maintain, in connection with the American Museum of Natural History, in Central Park, in the city of New York, a course of free instruction, illustrated by its collections, to the teachers of the common schools of that city, and through them to their pupils, and to the teachers of the common schools and of the normal schools throughout the State, who may wish to avail themselves of this training, and to furnish the schools of that city, and the several State normal schools, with such appliances and apparatus as are necessary to the proper presentation to their teachers and pupils of this instruction on human and comparative anatomy, physiology, and zoology, and other subjects upon which the board of education of the city of New York may require that oral instruction shall be given.

The Trustees of the Museum have furnished for the use of the State a lecture room in their Museum building, capable of seating about four hundred persons, and the services of Prof. Albert S. Bickmore, the Superintendent of the Museum, a thoroughly learned and expert scientist, in the various branches above named, have been secured by me to give the instruction thus provided for to the teachers, in a series of lectures, at the Museum on each Saturday. These lectures, illustrated by the natural history collections at the institution, and by means of the camera, several of which I have personally attended, were commenced in October, and have been well attended by teachers. They are of a most interesting and instruct-

ive character, and are giving much satisfaction to the school authorities and teachers of the city of New York. Appliances and apparatus to aid in the reproduction of this instruction have been supplied, as provided for in the statute, to the New York City schools and to the normal schools of the State. The work of this newly-organized institution being in the current school year, the statistical and other details relating to it will appear in my next annual report.

Our item read as follows:

"For the State Superintendent of Public Instruction, to enable him to establish and maintain in connection with the American Museum of Natural History, in Central Park, in the city of New York, a course of free instruction, to be given by the Curators of said Museum, and to be illustrated by its collections, to the teachers of the common schools of said city, and through them to their pupils, and to the teachers of the common schools and of the normal schools throughout the State who may wish to avail themselves of this training, and to furnish the several State normal schools with such appliances and apparatus as may be hereby supplied to the schools of said city, and are necessary for the proper presentation to their teachers and pupils of this instruction on human and comparative anatomy, physiology and zoology,, and other subjects upon which the Board of Education of said city may require that oral instruction shall be given, the sum of eighteen thousand dollars, to be paid by the Treasurer on the warrant of the Superintendent of Public Instruction, countersigned by the Comptroller."

This measure was passed by the legislature, and Governor Cleveland approved of our grant of $18,000. which was essentially like that he had vetoed the year previous appropriating $12,000.

Some years afterward, when he had been President for his first term, he attended a meeting held in our lecture-room at the Museum, and made a vigorous speech in the interest of a measure for protecting the forests of the Adirondacks and I was invited to close the conference by exhibiting a series of views of the ravages in those woods caused by needless fires. After the meeting, Mr. Cleveland turned to me and said "Professor, when I was Governor, I once vetoed an appropriation you needed for your illustrated lectures. I did it, not understanding the public importance of your work."

And I replied, "Yes! Mr. President, that is indeed true, and it is also true that afterwards you were the first Governor to approve of a bill granting us State aid and thus establishing our system on a permanent basis."

In accordance with the terms of the foregoing law, I planned a course of study extending over four years and following strictly the requirements of the laws of the State as embodied in the Teacher's Manual prepared by the Board of Education of our City. This instruction proceeding from Corals up to Man and slightly modified as the exigencies of the times demanded was approved by State Superintendent of Public Instruction and the City Superintendent of Schools. Subsequently the principals of the Normal Schools asked that the six lectures on Human Anatomy and Physiology, which, according to the scheme as first drawn, would have come in the last year, should be placed first on account of a mandatory law requiring them to teach "The Injurious Effects of Alcohol and Narcotics", an act which had just been passed by the Legislature, while there did not exist the possibility of properly carrying it into practice.

The series of lectures, as thus modified and actually delivered, was announced as follows:

Lectures to the teachers of the City and State of New York, given under the auspices of the State Department of Public Instruction, at the American Museum of Natural History, Eighth Avenue and Seventy-seventh Street, Central Park, New York, by Professor Albert S. Bickmore.

First Series.

Autumn of 1884.

Human Anatomy and Physiology.

1. The Skeleton.
2. The Muscular System.
3. The Arteries and Veins.
4. Nervous System and Senses.
5. Digestion and Respiration.
6. Hygiene.

Mineral Kingdom.

Building and Ornamental Stones.

7. Granites and Sandstones.
8. Limestones and Marbles.

Vegetable Kingdom.

Forestry.

9. Evergreens, the Pine, Spruce and Cedar.
10. Deciduous Trees, the Oak, Elm and Maple.

Spring of 1885.

Animal Kingdom.

11. Introductory--The Sea.
12. Corals and Sea Fans.
13. Oysters and Clams.
14. Marine Univalves and Snails.

15. The Nautilus and Argonauta.
16. Crabs and Lobsters.
17. Flies and Mosquitos.
18. Butterflies and Moths.
19. Bees and Ants.
20. Beetles.

Autumn of 1885.

Physical Geography

21. The Appalachians and Niagara.
22. The Mississippi Valley.
23. The National Yellowstone Park.
24. The Garden of the Gods.
25. The Canons of the Colorado.
26. The Yosemite Valley.
27. Mexico and Central America.
28. The Bermudas.
29. The Andes.
30. The Amazon.

Spring of 1886.

Zoology--Fishes.

31. Herring and Shad.
32. Salmon and Trout.
33. Halibut and Flounder.
34. Cod and Hake.
35. Sharks and Rays.

Reptiles.

36. Salamanders and Frogs.
37. Snakes and Lizards.

38. Swimming Birds and Waders.

39. Pheasants and Doves.

40. Eagles and Owls.

Autumn of 1886.

Geography and Ethnology.

41. The Atmosphere.

42. Switzerland.

43. Norway.

44. The Mediterranean.

45. The Rhine.

Useful Minerals.

46. Coal and Petroleum.

47. Iron and Lead.

48. Silver and Gold.

Articles of Food.

49. Tea and Coffee.

50. Indian Corn and Tobacco.

Spring of 1887.

Geography and Ethnology.

51. England--London.

52. France--Paris.

53. Germany--Berlin.

54. Russia--St. Petersburg.

Zoology -- Birds

55. Humming Birds.

56. Birds of Paradise.

Mammals.

57. Kangaroos and Opossums.

58. Elephants and Antelopes.

59. Sheep and Oxen.

60. Swine and Deer.

Autumn of 1887.

Geography and Ethnology.

61. Egypt.

62. Palestine.

63. Turkey.

64. Greece.

65. Italy.

66. Scotland.

67. India.

68. China.

69. Japan.

70. Pacific Islands.

Spring of 1888.

Articles of Food.

71. Wheat and Rice.

72. Sugar and Salt.

Zoology — Mammals.

73. The Whales and Manatees.

74. The Horse and Rhinoceros.

75. Dogs and Seals.

76. Lions and Tigers.

77. Monkeys of the New World.

78. Monkeys of the Old World.

Aboriginees of North America.

79. Eskimos and Indians of Alaska.

80. Indians of the United States.

To obtain accurate information regarding the injurious effects of alcohol, Dr. Francis Delafield and Dr. T. M. Prudden of the College of Physicians and Surgeons of this City, undertook to prepare for us microscopic sections from which Dr. Prudden made admirable original drawings which we reproduced in the form of stereopticon slides for each of the normal schools. These sections of the stomach, liver and kidneys were first taken from healthy subjects, and secondly from those dying in our hospitals from alcoholism, so this part of our work took on the attractiveness of original research. Without the establishment of our course of training, the mandatory law above mentioned would have necessarily been comparatively inoperative and this service we were fortunately able to render the State as soon as our illustrated system of teaching was placed under the State Superintendent of Public Instruction.

To make further space for our audience a third work room was added to the hall already composed of two, but the whole was continuously full through the year of 1885.

We began our system with the immediate purpose of giving instruction upon zoology, but I soon found that though I was speaking to the best teachers in the city, yet their knowledge of the physical geography of even our own land was not accurate and detailed enough for them to profit fully by my remarks upon the geographical distribution of the animals we were studying. Therefore in the autumn of 1885, we added physical geography to our former curriculum, which formerly dealt only with objects in the animal, vegetable and mineral kingdoms. We began the second year with the study of the principal features of our own state and of our own continent, my theory being that in such a system as ours these lectures should be regarded as

preliminary and introductory to the more special instruction which would naturally follow. I believe that each teacher should begin with his class in geography by studying the natural features of his own locality and its immediate surroundings, and next in order those of his own state, his own country, his own continent and finally the lands and seas of our globe. This programme is essentially the same as the introductory lectures, which Professor Huxley calls "Physiography" and which he also found his classes needed as a preparation and introduction to his exhaustive instruction subsequently given in physiology.

To aid us in presenting in the best manner then possible, the geographical wonders of the United States, Professor J. W. Powell, Director of our National Geological Survey, kindly permitted a photographer in Washington to make for us and for each of the Normal Schools stereopticon slides from over two hundred negatives selected from the large series that have been made at great expense by the skilful photographers connected with the Survey. The illustrations thus exhibited were the most complete which had up to that time been shown of the National Yellowstone Park, the Canon of the Colorado, and other parts of our western territory, over which the Survey extended.

Our attendance continued to increase to such an extent, that the trustees of the Museum made an application to the Board of Estimate and Apportionment, asking that the Park Department be granted the sum of $200,000., one half in 1885 and one half in 1886, for the purpose of constructing an addition to our building in order to provide increased exhibition space and a large hall fitted up with every appliance and convenience for giving instruction to the teachers of

our public schools and to the artisan and mechanic classes of our citizens. In presenting this application we were supported by Hon. William Wood, and by Superintendent Jasper of the Board of Education and by Mr. Wilbur Hudson, president of the Teachers' Association, who placed before the Board the following memorial, of especial significance and importance, coming as it did, directly from the teachers themselves.

"To the Honorable, the Board of Estimate and Apportionment of the City of New York:

Gentlemen: -- The undersigned officers of the Teachers' Association hereby respectfully memorialize your honorable board, setting forth the following important facts relating to public education in our city, and soliciting in regard to them your favorable consideration.

In accordance with the wise enactment of our Legislature, the State Superintendent of Public Instruction has entered into an arrangement with the trustees of the American Museum of Natural History on Central Park, for furnishing to the teachers of this city, free instruction concerning those subjects upon which we are required to give language lessons to our pupils, and to further aid us with specimens and books to illustrate this training, and render it peculiarly attractive. Lectures upon these topics have been inaugurated at the Museum, and the attendance, which is entirely voluntary on our part, has increased until the small hall which has from time to time been enlarged and can now accommodate less than 300, has been constantly crowded with nearly 400 teachers, including fully forty ladies who have been obliged to stand, and yet on two occasions this fall over 150 teachers have been turned away, or five times as many as attended the first course. If a suitable hall could be erected in

connection with the Museum we believe that there would be an average attendance of not less than 1,000.

This body of teachers represents the following number of pupils under the jurisdiction of the Board of Education, namely:

Whole number of different children taught during the year ending August 20th 1885 230,875

Average attendance 150,560

In the name and on behalf of this immense number of pupils and their parents and friends your memorialists respectfully ask that the application made by the trustees to your honorable board for means to provide another wing to their building, be granted, so that there may be ample space for a hall that will accommodate all the teachers who may wish to profit by the free instruction already generously provided by the State, and that in such additional structure more of the collections of the Museum may be displayed, which are needed to illustrate the lectures already made so attractive and useful to the cause of education in our city."

In addition to the lectures at the Museum there have been placed in each of the one hundred and sixty departments of the public schools of our city, a neat cabinet containing a series of the rocks of Manhatten Island, dried plants and many specimens of corals, shells, crustaceans, and insects and two volumes of Cassell's Natural History, for the teachers to use in repeating to their pupils the instruction they have received at the Park. Similar collections and books, and a stereopticon with many slides have been sent to each Normal School, and verbatim reports of the lectures. In this manner in 1885 our hopes began to be realised of reaching directly at the Museum those who were engaged in teaching in this city and vicinity, and indirectly through the science teachers of the State Normal Schools, we

commenced to be able to benefit those who were to become the teachers in the common schools throughout our commonwealth.

In 1886 we began our lectures with studies of our common "Food Fishes". I had already, while on a tour to the Normal Schools, visited the State Fish Hatchery at Caledonia, with my assistant Mr. L. C. Laudy, who was a very skilful photographer. We found that this institution under the management of Mr. Seth Green, was the best model of all we had seen for illustrating the artificial propagation of trout, salmon, and the other principal food-fishes of our fresh waters, and Mr. Laudy made a full series of fine views of this interesting establishment. To secure similar authentic illustrations of our great marine fisheries, Professor Spencer F. Baird, the United States Fish Commissioner, generously permitted us to have stereopticon slides made in Washington from the extensive series of negatives which had been taken to illustrate the American fisheries in the great international exhibition which had been recently held in London. In order to supplement these views, I was honored by the Minister of Marine and Fisheries of the Dominion of Canada with a letter of introduction and commendation to all the officers in his department residing in Nova Scotia, Cape Breton, New Brunswick and Quebec, and I journeyed with our photographer rapidly along those eastern shores as far as Gaspe.

In the autumn of 1886, our subjects included the physical geography of our western territories and in order that I might dedoribe those regions from my own personal studies, I solicited and received on account of the full reports of our lectures which were published in the daily press, the assistance of free passes for over nine thousand miles and in this way, by using my own salary, I was able to visit the National Yellowstone Park, Salt Lake, the Yosemite

Valley, the Grand Canon of the Colorado, and Pike's Peak. This was the beginning of my wide and expensive journeyings which have all been made for the twenty years of my lecturing, without any cost to our Museum or to the State, and this expenditure, with the purchase of all the books I have needed for an exhaustive study of the regions visited, has been my personal contribution each year toward the maintenance of our system of illustrated instruction. My library, thus acquired, has been kept in my office at the Museum and has always been available for the use of all who have attended our lectures and for all teachers and students who have been cordially invited to consult at their own convenience the volumes and papers I have gathered in many countries and I have also announced that I would always be very happy to answer any questions, that I could, regarding our own and the many foreign lands which it has been my privilege to visit.

In 1886 the Legislature, in order to give our work a more permanent character, generously provided for the maintenance of instruction during two years and Hon. Andrew S. Draper, then Superintendent of Public Instruction, who took a helpful interest in our efforts to aid in promoting the cause of free, public education, drew up for us the following contract between his Department and the Museum.

"Memorandum of an agreement made and entered into this 30th day of June, 1886, between Andrew S. Draper, as Superintendent of Public Instruction of the State of New York (pursuant to the authority conferred upon him so to do, by chapter 428 of the Laws of 1886) party of the first part, and the American Museum of Natural History in the city of New York, party of the second part.

The said American Museum of Natural History agrees to furnish each year, for two years, beginning on the 1st day of October 1886,

illustrated instruction to be given and illustrated by the curators of said Museum, on human and comparative anatomy, physiology, zoology, physical geography and such other subjects as the Superintendent of Public Instruction may require, as follows, viz:

First: Not less than 20 lectures at the hall connected with the Museum, on Saturday mornings between said dates, to the teachers of the common schools of the city of New York and vicinity.

Second: Not less than 10 lectures at the same place to teachers' institutes or associations or any body of common school teachers from outside of the city of New York who will apply for the same and will visit the Museum for that purpose.

Third: Not less than 12 lectures at the same place, but in the evening, to artisans, mechanics and other citizens.

It is also agreed by said Museum, that one of the curators, with such assistants as he shall require, shall, as soon as practicable after the 1st day of October, 1886, and also as soon as practicable after the 1st day of October, 1887, visit each of the Normal Schools at Albany, Brockport, Buffallo, Cortland, Fredonia, Genesee, Oswego, Potsdam and New Paltz, and the Normal College of the City of New York, and the Training School for Teachers, in the city of Brooklyn, and lecture once upon such such subject in the course as shall be selected by the principal of the school visited, and at the same time, see that apparatus previously forwarded to each of said schools is in perfect working order, and if not so in any case, he shall direct the principal about the necessary repairs for making it so, and he shall give the principals of said schools full instructions in relation to the apparatus in their charge in order to enable them to readily use the same in illustrating such printed copies of the

lectures delivered at the Museum as shall be forwarded to them. And it is further agreed that if such apparatus should at any time become incapable of use, or should any institution having the same be unable to operate it effectually, that said party of the second part shall send a duly qualified person to put the same in order, or to instruct such institution in the use thereof.

It is understood that said Museum shall provide all the help and accommodations requisite for carrying out the aforesaid undertakings such as the services of a photographer and assistants; the use of the elevator in said building, and the free use of the natural history collections belonging to said Museum for illustrating said lectures; and that the State of New York shall be liable to no expense for or on account of the services of persons and suitable accommodations for said lectures, except that the travelling expenses and hotel bills of persons visiting the Normal Schools, as hereinbefore provided, shall be paid by the said Superintendent of Public Instruction.

In consideration of the foregoing agreements, the said Superintendent of Public Instruction, for and on behalf of the State of New York, agrees that said State will, upon the performance of said agreements by the party of the second part, to the satisfaction of said Superintendent, pay each year of said two years covered by this agreement, to the said American Museum of Natural History, the sum of Eight thousand dollars ($8,000.) in equally monthly installments at the end of each month of the period covered by the terms of this agreement.

It is further agreed that said American Museum of Natural History shall, from time to time, with the approval of the

Superintendent of Public Instruction, make or purchase additional apparatus, books and appliances for use in giving said instruction at said Museum or at the State Normal Schools, or at the Normal College in the city of New York or the Training School for Teachers in the city of Brooklyn, or for distribution among the common schools of the city of New York, and with such approval, may likewise take or purchase photographic views of natural scenes or objects and reproduce the same in convenient form, or may purchase them after having been so reproduced, for use and distribution to the foregoing named institutions for the purposes, aforesaid, and may cause stenographic reports of the lectures so delivered at said Museum to be made and printed and distributed to the institutions hereinbefore named or otherwise as may be directed by said Superintendent. All apparatus, books, appliances or views so purchased, or produced, and the cost of all such stenographic reports and printing, shall be paid for by the State of New York at the actual cost of purchase or production, upon bills and sub-vouchers to be presented and audited by said Superintendent of Public Instruction and shall become the property of the State of New York.

It is agreed by said Museum that all property of the State in its immediate custody shall be properly cared for and shall be at all times subject to the order and direction of the Superintendent of Public Instruction, and that correct inventories thereof shall be furnished whenever requested by him.

It is furthermore agreed that all agreements entered into between the parties and hereinbefore set forth, may be terminated at the pleasure of the Superintendent of Public Instruction.

In Witness Whereof, the Superintendent of Public Instruction

does hereunto set his hand as such, and affixes the seal of the Department at the city of Albany, this 19th day of July, 1886, and the President of said American Museum of Natural History does hereunto set his hand on behalf of said Museum at the city of New York this 30th day of June 1886.

ANDREW S. DRAPER,

Superintendent of Public Instruction.

MORRIS K. JESUP,

President, American Museum of Natural History."

From my annual report submitted to Hon. A. L. Draper, Superintendent of Public Instruction on December 10th, 1887, the following extracts and summary of its statements are here made.

During my travels in Europe last year I carefully selected from the great variety of stereopticon slides obtainable in Paris and London the best and most instructive views for our lectures upon England, France, Germany and Russia, Nos. 51 to 54; and the throngs of teachers that at once came to the Museum proved we were giving the instruction they desired to use in their daily work in the public schools. This endorsement of our efforts of last spring was so gratifying that I determined to go again at my own personal expense to all the countries which were to be described in the Autumn course.

I first went via London, Paris and Brindisi to Alexandria and Cairo, and journeyed up the Nile as far as the First Cataract at Assouan, visiting, on my way up and down nearly all the most remarkable temples and tombs of the ancient Egyptians, and studying in detail the geology and the present ethnology and agriculture of the whole valley. His Highness, the Khedive accorded me an interview, and every facility was granted me by the Turkish Government to gather all the data required for my lectures.

From Cairo I proceeded via Ismailia and Port Said to Jaffa and Jerusalem, and having visited all the historical places in the holy city, went down to Bethlehem, the Convent of Mar Saba, and to the Dead Sea, and the Jordan, in the plain of Jericho. With an English gentleman and his wife, I journeyed throughout the whole interior of Palestine from Jerusalem to Nablus (or the ancient Shechem) and Nazareth and to the Sea of Galilee, ascenting on our way Mount Ebal and Little Hermon. From Tiberias we travelled northward, and attained the topmost summit of snowy Hermon, from which nearly all of Syria and Northern Palestine lay spread out at our feet like a map. We next proceeded to Damascus, and passing through the gigantic ruins of Baalbec, went up to the region of the Cedars of Lebanon which are south of the French Road, and thence I went down to the Mediterranean at Beyrout. From that city we steamed to Cyprus, Tripoli and Alexdretta and to Marsina, which is the present seaport of ancient Tarsus, and along the coast of Asia Minor to the island of Rhodes and Smyrna. Continuing northward, I passed through the Dardanelles to Constantinople and voyaged up and down the Bosphords until I had enjoyed every important view on both its Asiatic and European shores between the Turkish capital and the Black Sea. Turning southward I came to Athens and saw its ruins and the most recent excavations made up to that time, ascended Mount Pentelicus, and, through Dr. Schliemann's politeness, examined all the results of his costly explorations and saw Mycenae, Argos and Nauplia, and looked out over a large part of Greece from the top of Acro-Corinth. Steaming westward down the Corinthian gulf, I visited the Ionian Islands and again arrived at Brindisi, having been three months on this journey around the eastern Mediterranean.

In Italy, I went to Paestum, Naples and its neighboring bays and cities, including Pompeii, whence I ascended Vesuvius and witnessed an eruption of more than usual violence. Rome, Florence, Venice, Milan and the Italian Lakes, brought me to the Alps, whence I returned to Paris and London to select stereopticon slides on the many countries above mentioned.

To prepare for future lectures I again set out from the British capital and travelled throughout Belgium, Holland, Denmark, Sweden and southern Norway, and crossing the North Sea to Scotland, saw its charming lochs and glens and studied the geology of Staffa.

The attendance of teachers upon our lectures at the Museum had continued to grow in each succeeding course until on January 8th, 1887, it amounted to 504. Of this number 390 were packed into our little hall, designed to accommodate 275, and 114 by actual count were turned away because they were unable to get inside the doors.

As my experience had already shown me that the most popular lectures were those describing personal travels recently made in historic lands, I asked the Trustees to hire Chickering Hall for my lectures upon the countries bordering on the eastern Mediterranean Sea, in order that we might for our own information, learn how many teachers would attend such a course when delivered in a suitable hall and in a convenient location.

The numbers present at our ten lectures in the Autumn course of 1887 were as follows:

October 8,	1,285
" 15,	1,350
" 22,	1,325
" 29,	1,430

November 5,	1,400	
" 12,	1,400	
" 19,	1,400	
" 26,	1,400	
December 3,	1,200	
" 10,	1,200	(heavy rain storm)
Average Attendance	1,329	

The number of seats which were available in this hall, from which the illustrations could be seen, was 1,196, so that the average number seated on the steps of the aisles or who stood for the hour and a half that the lecture lasted was 133. Although there were present at the first lecture on October 8th, eighty-nine more auditors than could be seated, yet the number of applications for tickets by teachers, which came to us during the course would have filled the hall at the close, even if it had been entirely empty on the opening day; so that the estimate of the officers of the Teachers' Association made in the memorial presented to the Board of Estimate and Apportionment in 1885 that "if a suitable hall could be erected in connection with the Museum we believe that there would be an average attendance of not less than 1,000", proved to be abundantly verified by our experience in Chickering Hall.

The growth of attendance upon our instruction for the four years during which our lectures had been up to that time delivered under the auspices of the State Superintendent of Public Instruction is shown by the following statement of the number of teachers present at the opening session of each autumn course, viz:

October 13th 1884, at the Museum	221
October 10th 1885, " " "	324
October 16th 1886, " " "	358

October 8th, 1887, at Chickering Hall 1,285

The large dimensions of Chickering Hall afforded me an opportunity of trying, for the first time, an experiment which I had long been anxious to test; and that question was whether it would prove to be a feasible and desirable plan to use <u>two</u> screens instead of continuing the universal custom of having only <u>one</u>. To answer this query we employed two separate lanterns. The first was a single direct one, with which all our maps, plans and diagrams were displayed and while, for instance, a map of a certain locality was before the audience, with the second lantern, which was a double one, we exhibited a series of characteristic views of that region, which dissolved one into another. The maps were all colored, the land surfaces in a light brown, and the areas of the sea, and lakes and rivers, were tinted blue of various hues, to indicate their various depths.

Our skilful photographer and experienced operator, Mr. L. C. Laudy, managed both lanterns, unaided, with successful regularity and both of my innovations were decided by our audiences to be important advances in the art of presenting valuable instruction by the Visual Method, and were always adopted afterward in our lectures at the Museum.

A statement of the facts and figures briefly summarized above, were presented to the Legislature which began its session on the following January and which, without one dissenting vote, passed a bill that was promptly signed by the Governor authorizing the Department of Parks, with the concurrence of the Board of Estimate and Apportionment to erect and equip an addition to our building, which "shall include suitable space for the exhibition of the specimens of

the Museum, now stored for want of room to display them to the public, and shall also include a lecture hall, which can be used for the purpose of giving to the teachers of the common schools, and the normal schools of the State, and to artisans, mechanics and other citizens, the instruction provided for them in chapter 428 of the laws of 1886."

This law also authorized the issue of city bonds to the amount of $400,000. for erecting and equipping said structure.

With this generous appropriation of twice the amount we asked for in vain two years before, the Department of Parks commenced the erection of the central part of our southern facade, where is now the principal entrance into the present edifice.

The steady expansion of our system without the slightest effort on my part was by 1887 its marked characteristic. One day of that year while quietly studying in my office at the Museum, I found myself honored by an unexpected call from all four of the Institute Conductors, and they immediately announced the business that had brought them down from Albany, by saying, "Professor, your lectures which are repeated by the Science Teachers at the State Normal Schools, have aroused such genuine enthusiasm that we have come to ask you if we also cannot give just such instruction to our audiences of about 60,000 teachers and local officers of education, who gather every year at our Institutes." "Certainly you can. The teachers, whom you describe as so successful, have been trained to be only instructors of classes, while you are experienced conductors of educational exercises in which large audiences of mature persons freely participate. The only practical difficulty in the way is to answer the question how can the comparatively small expense of furnishing a

lantern outfit and a single new lecture each year for each of you be provided, and I deem it so important that you should be enlisted as active coworkers in what would so obviously be a most important part of the illustrative teaching we are carrying on at the expense of the State, that I will ask those who are already participants of our fund to agree with me in the wisdom of furnishing you with the small amount of material you will require as you are continually journeying over the area of our Commonwealth which is outside of our cities and large towns that are already recipients of the benefits of our system." This privilege of adding the Institute Conductors to our corps of active and successful lecturerers I readily obtained and after 1888 they entered into this addition to their previous labors with hearty enthusiasm. As an illustration of how earnestly the people of many villages have appreciated the privilege of attending the Institute on the evening of the illustrated lecture, I was told that at a large village near Rochester the members of an Institute adjourned late one afternoon, expecting to reassemble as usual in the evening but when they returned to the hall they found it overflowing with citizens from the town who were already in possession of the premises, and the Conductor had no alternative but to give his lecture first to them and then to repeat it the following evening to the teachers who were attending the regular sessions.

At that stage of our progress we were especially indebted to the cordial cooperation of General A. W. Greely, chief signal officer of the United States Army, for the loan of the priceless and unique negatives made by Mr. Rice during the three years of their memorable experience in the Arctic regions.

To be able to speak from personal observation upon the various

portions of our State and the adjoining regions up to the autumn of 1889, I traveled at my own personal expense from Kingston on Lake Ontario, down the St. Lawrence, through the Thousand Islands and the Long Sault and the Lachine rapids to Montreal, and thence to Quebec, the Falls of Montmorency and on to the mouth of the Saguenay and up that picturesque river and to the head of navigation. I also traveled in like manner through the White Mountains and ascended all the principal peaks of the Catskills. The excellence of our slides now began to bring to our halls many prominent educators from other states.

As our illustrations could only be produced in a darkened room, our auditors were unable to make full notes, and I therefore prepared, at the cost of much time and labor, lists of the slides, and of all the books in my library that furnished the latest and fullest information on the subjects to be presented. These papers the teachers took with them as they entered the hall and carefully kept to remind them of the illustrations given.

In order that the autumn course of 1889 might be delivered in the new hall our trustees and the park commissioners agreed that a temporary roof should be placed over the floor above the audience room. This hall, which was unique, inasmuch as it had been constructed for a special kind of public instruction may be thus briefly described. Its interior dimensions were 110 feet long, 60 feet wide and 28 feet ~~xxxx~~ high. The stage was placed at the middle of one of the longer sides, and the principal entrance, from the adjoining exhibition hall was opposite. There was no pillar or other obstruction of any kind to prevent an uninterrupted view of both screens, upon which the series of illustrations were displayed. The row of seats fol-

lowed a nearly elliptical curve, and rose, one above the other, so that each auditor had a clear view of the speaker and the two screens. The aisles consisted of a main one passing down from the entrance to the stage and one on the right and one on the left, parallel with it. A wide passage also curved around from the main entrance and extended along the sides of the room. The corners most distant from the speaker were occupied by rows of seats rising one above another, so that every person in the hall had a perfectly commanding view. The two double lanterns were necessarily placed, one on the right and one on the left of the main entrance, and the illustrations were projected over the heads of the audience, and therefore no person entering the room after the lecture began could by any possibility intercept the light from the lanterns and cause his silhouette to appear on the screens, nor could any movement of the audience mar the continuity and uniform harmony of a lecture from its opening to its close. The plan of using two screens, and of exhibiting maps on one, so that our audiences could understand the proper relation of the views displayed on the other, at once proved even more acceptable than when I first introduced this improvement two years before in Chickering Hall. Comparing facts is the true scientific method of study and the contrasts which we thus placed before our audiences enabled each hearer to compare for himself the facts presented for his consideration and to appreciate for himself the value of the resemblances and differences thus shown.

To prepare myself to speak from personal observation on central and western Canada and Alaska, I journeyed during the summer of 1889, through the courtesy of the Canadian Pacific Railway, over their whole line from Montreal to Vancouver. Thence I passed to Victoria and down to Port Townsend, Seattle and Tacoma, whence we sailed on

the steamer Corona for Alaska. The voyage occupied fourteen days and our course northward and return extended over 2,370 miles or more than two-thirds of the distance from New York across the Atlantic to Southampton. Nearly the whole route is as much in an inland passage as would be a voyage up the Hudson through our own Highlands, but Storm King and its neighboring mountains hardly suggest the majestic scenery we had constantly in view, and which culminated in its wonders at the Muir and Taku glaciers. The close approach we then made, right up under the front of the Muir glaciers, is now declared to be impossible by subsequent tourists, and the scenery at that point then in places four hundred feet high, is now far less imposing.

From Tacoma, by the courtesy of the Northern Pacific Railroad, we came eastward over the coast range, and across the northerly part of the Great Basin to the Rocky mountains and the National Yellowstone Park, where we traveled for ten days, studying the places I had not visited in my previous journey in 1885. Returning westward to Spokane Falls, we traveled through the remarkably fertile wheat country of the Palouse region to Walla Walla, and down the Columbia river to Portland. Thence I returned to Tacoma and Vancouver, and climbed the grand glaciers of the Selkirks, arriving back to Montreal via the Canadian Pacific Railway, after an absence of three months, during which we had traveled 12,000 miles. The great audiences that gathered in our new hall to learn of these parts of our own continent fully repaid me for the very considerable expense of making these long journeyings. The old hall in the roof of our building seated only 250 persons comfortably, but the new one had seats for nearly 1,000 auditors and yet on all fair days all the aisles and standing

space was at this, our first course in it, filled to overflowing.

At the opening lecture of this series, Doctor Andrew S. Draper, the State Superintendent of Public Instruction, did us the honor to attend and make a very complimentary address upon the unequalled facilities then furnished by the Museum for promoting public education by our visual method.

In the autumn of 1889 our attendance in the new hall averaged 1,150, and as there were only 1,000 seats, 150 teachers were obliged to stand throughout the hour and a half occupied in the delivery of each lecture. At the closing subject of Alaska 1,300 were admitted and so many were turned away, for want of standing room, that this lecture was repeated the following Saturday to 700. Afterwards at an evening lecture to members 1,000 citizens were present, making the total number of teachers and other citizens who came to the Museum to learn about that one subject to be over 3,000.

As the existing contract between the Department and the Museum would expire on the 1st day of October 1890, a bill for continuing the work during the ensuing two years was unanimously passed by both branches of the Legislature.

To prepare myself to speak from personal observation upon the various countries bordering on the Mediterranean and to secure proper illustrations for my lectures on these lands, I journeyed to those regions at my own personal expense, as in all previous years. From New York we sailed to Gibraltar and Malaga, and thence crossed the Mediterranean to Oran, one of the principal cities for export in Algeria. Proceeding by land to the city of Algiers, my party and myself visited its suburbs and went down to Bougie, which is one of the most strikingly picturesque ports on the whole coast of the Mediterranean.

A carriage road, constructed by French military engineers led us directly through the coast range of the Atlas Mountains to the famous gorge of Chabot. Constantine we found to be a large city situated on a high mountain. It has been an important capital since the time of the Romans. Turning southward we crossed all the remaining mountain chains including the Great Atlas Range, and came down to the desolate waste of the Desert of Sahara at Biskra. From Constantine we continued eastward to Tunis and visited the ruins of Carthage, whose sad history makes it one of the most thrilling places on which a traveler can stand throughout all the borders of the Mediterranean Sea. From Goletta, the port of Tunis, we returned by a mail steamer that stopped at every considerable port on its way to Algiers. Returning to Oran we journeyed to Tlemcen, which was the principal city of the Moorish empire of Algeria, when Spain was subjugated by Ferdinand and Isabella, and the last Moorish Sultan was driven from the Alhambra to these shores. Our journeys in Algeria extended to over 2,200 miles.

Crossing the Mediterranean from Oran to Marseilles we traveled along the northern flanks of the Pyrenees to Pau and Biarritz on the Bay of Biscay, passing up from time to time into those valleys which are most noted for their hot springs and charming scenery, and ascending that commanding mountain, the Pic-du-Midi, where the French government has a most elaborately equipped signal station for its weather bureau. At Bayonne I learned to my amusement that our bill for continuing the instruction to teachers at the Museum, had not been approved by the Governor and I was therefore obliged to turn my face homeward at once, instead of completing my plan for traveling in the Tyrol and other parts of Central Europe.

In order that our work, which had been carried on by the State

continuously since its inception in the year 1884, might not suffer any interruption, the Board of Education of our city at one of its regular meetings unanimously adopted the following preambles and resolutions:

WHEREAS, This board learns with great regret that the bill for continuing the lectures given under the auspices of the State Superintendent of Public Instruction, at the American Museum of Natural History, to our teachers, which passed the last Legislature, has failed to become a law and that no provision is now made by the State for carrying on this important aid to the instructors in our public schools; and,

WHEREAS, These illustrated lectures have been given continuously for the past six years with steadily increasing usefulness to our teachers year by year; and,

WHEREAS, Very recently the city has generously enabled the Museum to provide a spacious hall, specially arranged for visual instruction; and,

WHEREAS, It is shown on page 590 of the report of the State Superintendent of Public Instruction, transmitted to the Legislature on January 7, 1890, that the aggregate school tax, raised by the State for the year beginning October 1, 1888, was $3,469,199.95, of which amount the city of New York paid $1,560,373.51, or over forty-four per cent, and of this sum only $684,094.42 was appropriated for our own schools, while the balance, $876,279.09, was taken from us to maintain public schools outside our corporate limits; and,

WHEREAS, Of the $173,734.06 paid out of the State treasury for the maintenance of the State normal schools in the same year, our city, in its payment cited above, contributed its forty-four per cent, or $77,322.98, while the bill for continuing the instruction to our teachers only asked for $15,000, or less than one-fifth of the sum we paid toward the support of the normal schools of the State and less than two per cent of the balance of our tax, which was left in the State treasury for the support of public education outside our city, and even this small sum was not granted; so that it is evident that justice has not been rendered to the million and a half of our citizens and the 4,000 teachers under our charge; therefore,

RESOLVED, That this board hereby expresses its high appreciation of the ability and efficiency with which these lectures have been conducted and of their great value as educational aids and incentives to the teachers of our public schools; and,

RESOLVED, We hereby solicit the trustees of the American Museum of Natural History and the State Superintendent of Public Instruction to provide, if possible, some way to avoid any interruption in this important work until the next session of the Legislature, when it is hoped and believed that the usual proper provision will be made.

Resolved, That a copy of these resolutions be forward to the Governor, the State Superintendent of Public Instruction, and the trustees of the American Museum of Natural History, and that the committee on "Course of Study" confer with the authorities above named, with the view of securing the continuance of the aforesaid lectures and instruction to our teachers.

In my report to Hon. A. S. Draper, Superintendent of Public Instruction, which was dated October 13th, 1891, I stated that in addition to the foregoing resolutions adopted by our city Board of Education, the teachers themselves of New York, and Brooklyn, and Kings, Queens, and Westchester counties to the number of nearly 5,000, prepared and sent up a memorial to His Excellency, the Governor, endorsing the resolutions of our city Board.

In response to this petition, the Legislature promptly passed a bill providing the usual sum for continuing our educational work, during the four years of 1891, 1892, 1893, and 1894.

Our lectures with their subjects and dates which was continued from number 80 delivered in the spring of 1888, up to number 182 delivered in the spring of 1895, is here inserted on consecutive pages in order that students of our system may the more easily glance over the range of topics which were included in our illustrated studies up to the end of the latter year.

Second Series.

Autumn of 1888.

Introductory.

81. The Theory of LaPlace — Nebulae and Comets.

82. The Planets.

83. The Sun.

84. The Moon and the Tides.

The Earth — Geology and Zoology.

85. The Azoic Age, and the Age of Invertebrates.

86. The Age of Fishes, and the Age of Plants.

87. The Age of Reptiles, and the Age of Mammals.

Geography and Zoology.

88. The Atlantic Ocean -- The Bermudas.

89. The Pacific Ocean -- The Hawaiian Islands and New Zealand.

90. The Indian Ocean -- Mautitius.

Spring of 1889.

Geography and Geology.

91. The Palisades and the Highlands.

92. The Catskills and the Adirondacks.

93. The White Mountains.

94. The Lakes and Glens of New York.

95. The Falls of Niagara.

96. The St. Lawrence and the Saguenay.

97. The Mississippi Valley and Gulf States.

Botany.

98. The Stem and the Leaf.

99. The Flower and the Fruit.

100. The Forests of America.

Autumn of 1889.

Geography and Ethnology.

101. Belgium.

102. Holland.

103. Denmark and Sweden.

Geography and Geology.

104. The National Yellowstone Park.

105. Colorado -- Pike's Peak and Monument Park.

106. The Canons of the Rocky Mountains.

107. The Great Basin and the Sierras.

108. California -- The Yosemite Valley.

109. British Columbia.

110. Alaska.

Spring of 1890.

Geography and Ethnology.

111. Oregon and Washington.

112. Mexico.

113. Central America and Peru.

114. Chili and Brazil.

115. The West Indies -- Cuba.

Zoology and Geography.

116. Sponges and Starfishes.

117. Corals and Coral Islands.

118. The Oyster.

119. The Nautilus.

120. Crabs and Lobsters.

Autumn of 1891.

Course A on Geography,

and B on Zoology.

131 A. Lower Egypt.

132 B. Butterflies and Moths.

133 B. Upper Egypt.

134 B. Beetles, Bees and Ants.

135 A. Palestine -- Jerusalem.

136 B. Flies and Grasshoppers.

137 A. Northern Syria -- Damascus.

138 B. Food Fishes from Fresh Waters.

139.A. Greece -- Athens.

140 B. Food Fishes from the Sea.

Spring of 1892.

Course A on Geography and B on Zoology.

141 A. Turkey - Constantinople.

142 B. Reptiles.

143 A. The Alps.

144 B. Birds of North America.

145 A. The Rhine.

146 B. Birds of South America.

147 A. Southern Norway.

148 B. Birds of Europe and Asia.

149 A. Northern Norway.

150 B. Birds of Africa, India and Australia.

Spring of 1893.

151 A. Morocco - Tangier.

152 B. Mammals of North America.

153 A. Northern Spain -- Burgos.

154 B. Mammals of South America.

155 A. Portugal -- Lisbon.

156 B. Mammals of Europe and Northern Asia.

157 A. Central Spain -- Madrid.

158 B. Mammals of Africa.

159 A. Southern Spain -- The Alhambra.

160 B. Mammals of India and Australia.

Autumn of 1893.

(Note: By this date the audience had increased so much that each lecture was repeated on the alternative Saturdays.)

161. World's Fairs, from London, 1851, to Paris, 1889.

The Columbian Exposition.

162. Its Organization and Administration.

Useful Minerals and Foods.

163. Department of Mines and Mining - Iron, Copper and Salt.

164. Department of Mines and Mining - Silver, Gold and Diamonds.

165. Department of Agriculture - Wheat, Rice and Indian Corn.

Spring of 1894.

(Continued from the Autumn Course of 1893)

166. Horticultural and Foreign Buildings.

167. Machinery, Electricity and Manufacturers' Buildings.

168. Woman's, Government and Art Buildings.

169. The Midway Plaisance and American Archaeology.

170. Races and Foreign Buildings at Paris Fair of 1889.

Autumn of 1894.

Geography.

171. Southern Ireland -- The Lakes of Killarney.

172. Northern Ireland -- The Giant's Causeway

173. Scotland -- The Highlands.

174. Scotland -- The Lowlands.

175. Wales.

Spring of 1895.

(Continued from Autumn Course of 1894)

Geography and Zoology. On Alternate Saturdays.

176. Northern England -- The Lakes and Stratford-on-Avon.

177. English Universities and Cathedrals.

178. Southern England -- London.

Human Anatomy and Physiology. On successive Saturdays

179. The Skeleton and Muscles.

180. The Arteries and Veins.

181. Digestion and Respiration.

182. The Nervous System.

Besides the preparation and delivery of the above one hundred and eighty-two lectures, with the aid of my assistants I furnished from 1884 to 1895 inclusive, in accordance with the provisions of

chapter 6, of the Laws of 1893 and previous similar statutes to the office of the Department of Albany, to the State Normal Schools, the conductors of Teachers' institutes, and to the superintendents of schools, the following apparatus and slides:

		Slides.
1884.	Furnished to the normal schools a collection of geological specimens, books, a lantern outfit, and 3,069 slides -	3,069.
1885.	Furnished to the normal schools, additional apparatus, books and 3,685 slides, and to each of 160 departments of the public schools of New York city a cabinet of specimens and Cassell's Natural History -	3,685.
1886.	Furnished to the normal schools a pair of steel cylinders for gas, also other apparatus, books and slide boxes and 3,060 slides - - - - - - - - - - - -	3,060.
1887.	Furnished to the normal schools and to the office of the Department of Albany, 293 slides each; in all 3,516 slides -	3,516.
1888.	Furnished to the normal schools, and to the office of the Department at Albany, 111 slides each in all, 1,332 slides; also to the normal schools a collection of skins of North American birds numbering 64 species. Furnished to the normal schools and the common schools of New York city 125 sets of glass tubes filled with specimens to illustrate the lectures on Food and with each series the volume on Foods prepared by the South Kensington Museum; also to each of the conductors of teachers' institutes a complete lantern outfit and 75 slides, in all 300 slides -	1,632.
1889.	Furnished to the normal schools, with exception of that at Plattsburgh, and to the office of the Department at Albany, 429 slides each; in all 5,577 slides; and to the new normal school at Plattsburgh 318 slides; also to each of the conductors of teachers' institutes 75 slides; in all 375 slides -	6,270.
1890.	Furnished to the normal schools and to the office of the Department at Albany 250 slides each; in all 3,500 slides; and to each of the conductors of teachers' institutes 60 slides, one half of which were colored; in all, 240 slides - - - - - - - - - - - -	3,740.
1891 and 1892.	Furnished to the normal schools and to the Office of the Department at Albany, 139 slides each, 46 of which were colored; in all 1,946 slides - - - -	1,946

Slides.

1893. Furnished to the normal schools a complete apparatus for making oxygen gas, and the necessary pump for compressing the gases into the steel cylinders; also to each of the normal schools and to the office of the Department at Albany 131 slides; 44 of which were colored, in all, 1,834 slides; and to each of the conductors of teachers' institutes 72 slides, 36 of which were colored, in all 360 slides - 2,194.

1894. Furnished to the normal school at Oneonta, new lantern, gas cylinders, pump and 288 slides (to replace those destroyed by fire); and to each of the conductors of teachers' institutes, 144 slides, 62 of which were colored; in all 720 slides - - - - - - - - - - 1,008.

1895. Furnished to each of the normal schools 149 slides, 85 of which were colored, in all 1,937 slides; and to the conductors of teachers' institutes and their supervisors 166 slides each, 81 of which were colored; in all 996 slides - - - - - - - - - - - - - - - - - - 2,933.

Also, under the provisions of Chapter 362, Laws of 1895, the superintendent of schools in each of the cities and villages entitled to the same had been furnished, up to the close of that year, with a complete lantern outfit and with 4,896 slides, making the total number of slides supplied up to December 16th 1895 to be 37,949.

During the summer of 1891, in order to gather the most complete data and obtain the finest illustrations for our lecture on the "Food Fishes from the Sea", I journeyed to St. Johns, Newfoundland, and thence along the eastern side of that island, entering all its principal bays, up to the Strait of Belle Isle. After coasting along both shores of that passage into the Gulf of St. Lawrence, I continued northward up the Atlantic coast of Labrador, a distance by the route followed over 500 miles, studying the cod-fishery in all its phases, enjoying views of the most fantastically shaped icebergs that float in any sea, and finally at Hopedale and Nain seeing the Eskimos, the aborigines of this frozen land. The whole distance made by our steamers from St. Johns to Nain and return was 2,200 miles.

This year we introduced a new feature into our former educational labors by adding a "Holiday Course", which was free to all our citizens without even the formality of requiring a ticket. To test the desire on the part of the public for illustrated instruction on such occasions, I gave a lecture on Thanksgiving and Christmas 1890, and on New Year's and Washington's Birthday 1891. The audience steadily increased until on the last occasion, our hall, designed to seat 1,000 persons was thronged with 1,200 half an hour before it was time to commence and we were obliged to close the doors. During the next thirty minutes, as nearly as we could estimate, 1,800 more of our citizens, who could not be accommodated came to see our representations and hear our descriptions of the natural wonders of the National Yellowstone Park. Such a manifestation of the desire of our artisans, mechanics and other citizens to learn of the geography and enjoy the beautiful scenery of our own land, at once fixed the "Holiday Course" as a regular part of labors for future years.

In the Spring of the following year, 1892, I gave the following lectures:

141 A, Feb. 6th, Constantinople.

143 A, Feb. 20th, TheAlps -- Switzerland.

145 A, March 5th, The Rhine and its Castles.

147 A, March 19th, Southern Norway -- Christiania.

149 A, April 2nd, Northern Norway -- The Midnight Sun.

and my report to Hon. James F. Crooker, Superintendent of Public Instruction, stated that the attendance upon this instruction exceeded all our experience, since our Visual Method of promoting public education was first established by theState in 1884. At three of these five lectures from three hundred to five hundred teachers were

turned away for want of space; and when we studied Northern Norway and The Midnight Sun, all of our 1,000 seats were occupied half an hour before the time for the lecture to begin, and immediately after nearly 400 stood in the aisles and 700 were turned away unable to get inside of our great audience-room. I therefore repeated this lecture on April sixteenth to those who had not been present before and we had a second audience of nearly 1,000.

This continued overflow of instructors from our public schools, who were giving of their own time on Saturday forenoon, when they were not engaged in teaching, led the prominent educators of our city to address his Honor the Mayor, the following memorial upon the immediate necessity for a larger auditorium:

To His Honor HUGH J. GRANT,

Mayor of the City of New York:

SIR:--- The undersigned citizens of New York desire to respectfully present to your honor the following memorial, and solicit your favorable consideration of the following important facts relating to the promotion of public education in this metropolis:

In the year 1882 the trustees of the American Museum of Natural History, upon consultation with our board of education, instituted a course of lectures to the teachers of our city upon topics relating to that branch of natural science. This instruction was attended by gratifying numbers, because it supplied information which previously existing statutes required our teachers to impart to their pupils, but which they could obtain in no other way than in connection with the extensive collections of the museum.

The illustrative method employed soon proved so effective, that this new system of instruction became of absorbing interest to the

principals of the State normal schools, and they joined our teachers in soliciting the Legislature in 1884 to provide ample means for carrying on the lectures at the museum under the auspices of the State Department of Public Instruction, and for repeating them at the normal schools and the teachers' institutes throughout the State.

The Legislature responded to the call by the passage of an act meeting the popular will.

The first lecture-room proving too small it was enlarged from time to time by taking in adjacent rooms, until more space was not obtainable in the museum building. Then the city began erecting a new wing, in which was provided the present temporary hall, seating 1,000 persons; and now before that wing is completed, the hall has been very frequently overcrowded -- for example, at the lecture Saturday, March 5th, all the seats were occupied, 300 auditors were compelled to stand in the aisles, and 350 others were turned away from the doors, unable to gain admission.

The Legislature at its session last winter, in accordance with resolutions adopted by the board of education, and in response to a memorial signed by over 5,000 teachers of this city and vicinity, provided for the continuance of this instruction during the years 1891, 1892, 1893 and 1894, and authorized its repetition to all citizens visiting the museum upon the legal holidays.

The usefulness of these illustrated lectures, in which Professor Bickmore presents in simple language the results of his studies and travels, is limited only by the size of the hall.

These lectures are entertaining and instructive to all our citizens of whatever degree of culture, because every subject treated is illustrated by skillfully prepared views of the countries through

which the lecturer conducts his audience, and of the animals and plants described. Even those who cannot speak or hear can profit to a large degree by this visual mode of imparting knowledge, here first successfully wrought out and used as an educational agency, and which prominent educators throughout the country have indorsed and desire to see established by the educational authorities in their respective States.

Your memorialists, therefore, respectfully express the hope that you will agree with them in the view that our metropolis, great among the great cities of the earth, in all her diversified material interests, should provide instruction for her teachers and other citizens upon a scale commensurate with her population and demands.

To this end it is absolutely necessary that the facilities at the museum be increased. This can be done by an addition to the present building of a structure adequate to the constantly increasing demand, and in accordance with the general plan already matured by the department of public parks and the trustees of the museum; such structure to be so erected as to contain an auditorium capable of seating 2,500 or 3,000 persons.

As this addition to the educational means of our city will be of constantly increasing value, it appears to us that the sum to supply it could and should be obtained by the issue of bonds by the city in the usual manner; and your memorialists trust that your honor will sanction the taking of immediate steps to secure the requisite legislation during the present session, in order that our city may reap at the earliest day the full advantage of this important instruction already provided by the State.

Respectfully submitted,

JOHN L. N. HUNT,
President Board of Education.

THOMAS HUNTER,
President Normal College, New York City.

ALEX. S. WEBB,
President The College of the City of NewYork.

SETH LOW,
President of Columbia College.

J. H. SLINGER,
O.P., Rector of St. Vincent Ferrer Church.

W. O. B. PARDOW, S. J.,
Pres't of the College of St. Francis Xavier.

HENRY M. MacCRACKEN,
Chancellor of the University of the City of New York.

Mayor Grant cordially endorsed the above views and a law was unanimously passed by the Legislature providing $400,000. for our present auditorium, which is the lower section of a high tower that is planned to ultimately rise above and dominate the whole immense structure, of which the portion now completed forms but little more than one fourth part.

In the midst of this success we were surprised at the failure of our regular appropriation, but our trustees most generously agreed to advance the funds necessary for continuing our lectures until a new bill could be passed and I at once proceeded to carry out my previously formed plans of traveling in those countries of Europe upon which I was soon to speak.

Landing at Gibraltar, I crossed to Tangiers and studied Morocco. Returning to Spain, at Cadiz, I photographed the Caravel Santa Maria, the exact copy of the ship on which Columbus discovered the New World, and at Palos and the convent of La Rabida I gathered original data of importance relating to the history of the discoverer.

Having journeyed over all of southern and central Spain, I proceeded from Madrid to Lisbon and traveled throughout Portugal, which proved to be a land of such remarkable fertility that it can be well described as a veritable garden. Northern Spain, southern France and northern Italy were not successively studied and I made an extended journey through the Austria Tyrol and southern Germany. I brought back over 500 negatives of these historic and scenic lands.

In 1893 the legislature passed a bill so promptly that it was known as Chapter 6, of the Laws of that year. It provided us with eighteen thousand dollars a year.

We began our course with the design of following our usual custom of presenting a new topic each Saturday, but at the first lecture 300 teachers were unable to find standing room within our large auditorium and at the second lecture 500 more were turned away. Then in accordance with the advice of the president of our city Board of Education, of the superintendent of public schools of Brooklyn, and of a prominent educator in the parochial schools of our city, the Superintendent of Public Instruction authorized me to divide my audience regularly into two parts, Section A, consisting of the teachers from schools Nos. 1, 3, 5, and the uneven numbers on one Saturday, and Section B from schools Nos. 2, 4, 6, 8, and the even numbers on the following Saturday. In this way we accommodated all the teachers from our part of the State and many prominent educators who improved the occasion to visit our city and listen to the

following lectures.

Section A.

Autumn of 1893.

On alternate Saturdays.

161, October 14th, World's Fairs from London, 1851, to Paris, 1889.

The Columbian Exposition of 1893.

162, October 21st, Its Organization and Administration.

Useful Minerals and Foods.

163, November 4th, Department of Mines and Mining, Iron, Copper and Salt.

164, November 18th, Department of Mines and Mining, Silver, Gold and Diamonds.

165, December 2nd, Department of Agriculture, Wheat, Rice and Indian Corn.

At the opening of this instruction we were honored with the presence of His Excellency, the Governor, who favored our audience of teachers with the following address:

Governor Roswell P. Flower, was present by invitation of Mr. Morris K. Jesup, President of the Museum, but Mr. Jesup being necessarily out of town, the Governor was introduced by myself to the audience in the following manner:

Professor Bickmore: Teachers and Friends — We extend to you a cordial greeting as we today resume our studies in this hall. In the regular course of studies which we are following in accordance with the requirements of the statutes describing the subjects which are to be taught in the public schools of this city and State, we come to the useful Minerals and Foods. Fortunately there has occurred this summer the grandest gathering of the products of this nature that the world has ever seen in the unrivalled fair by the shores of Lake

Michigan, at Chicago. I have therefore availed myself of this unexampled occasion, the great educational opportunity of the present generation, to incorporate in our study of the useful minerals and foods the results that can be learned by a careful study at the fair. I have spent nine weeks there, and have traveled, I judge, about 500 miles, within the borders of Jackson Park. We will be able to present to you in a more attractive form than in any preceding course of lectures, the results of these studies.

As we travel through the northern portion of the park, and come into that grand avenue of buildings erected by the different States of the Union, we hear constantly the inquiry made, "What is this grand and appropriate edifice opposite the central portion of the Art Palace?" And those of us who came from the Empire State have had the gratification to explain to the people from other parts of the Union that this fine structure which they are enquiring about is the New York State Building.

When we pass into that grand structure, the largest ever erected, the Building of Manufacturers and Liberal Arts, and come to the focus of the whole at its center, we find there, conspicuously placed, what is probably the grandest exhibition of silverware and jewels that the world has ever seen. They came from our own city.

Likewise, when we pass into the agricultural building, into the mines and mining building, into the Electrical building and into every branch of this gigantic fair, which I shall have the pleasure to place before you, we are gratified with the prominent and honorable part that our citizens and our city and State authorities have taken in this grand celebration.

Among those who have enabled us to feel proud of what the Empire

State has been able to exhibit to the country, and to the nations that have gathered from all parts of the world, there is no one who has done so much as the gentleman who has honored us with his presence today. I have the honor of introducing to you Governor Flower, of the Empire State.

Governor Flower: -- Professor Bickmore, Ladies and Gentlemen, and Teachers of the Common Schools of this vicinity: I expected when I came here this morning to be instructed first by the lecture of Professor Bickmore, in order to get some ideas about which I might say something to you afterwards. He, however, being the professor in this school, has forced me to speak to you first; and were it not that you are teachers, and that I feel somewhat at home with teachers, having been a teacher myself, and knowing how great and glorious is this occupation, knowing that upon the 30,000 teachers of our common schools in this State depends the perpetuity of our great State, I would not attempt to address you. The mother, when her child is 4 or 5 years of age, puts her in the hands of the teachers of the State, and I know that on you, therefore, depends, more than on anybody else, the rightful use of the powers which nature gives the child. If you can wield these powers in such a way as to make the children govern themselves, if you can teach the children to be governed, if you can teach them our form of government in its rudimentary form, you can make this the most powerful and the greatest government that the world has ever known.

This common school system of ours (of which you are the finished product, because you have gone through the regular gradations of common school, high school and normal college) is the greatest system existing in any State in this Union.

This lecture course is one which I permitted for the teachers of the pupils of this State. It is, like the American Museum, an object lesson to those who cannot go abroad, to those who want a little better education, to those who want to learn a little more of the world than they can find in the common school books. These lectures, like those to which you are about to listen, puts the polish on the pupils of the common schools. After you teachers have heard them you can enlarge the conceptions of your pupils. I presume that many people in New York have never been out of New York island. This is a great country, and I suppose that in the lectures that are delivered here you get enlightened on the Old World as well as the new, and in this way you broaden the views of those you are instructing. Further than this, the people of the State do not like to go in their expenditure of moneys, for the reason that beyond this rich men should take up the effort in the academies, in the colleges, in the universities, and do the polishing which higher education gives. But as far as this the State is bound to go as a police regulation to protect her citizens against all kinds of theories of government except our own.

I am told that in this great city over 300,000 people can not read and write the English language. They come here because this government is an asylum for all the people of the old world. We bid them welcome; but we ask them merely to put their children into our common schools; and no matter what their brogue is, whether it is Irish, German, Scotch, Swedish, Norwegian, Dutch, or what else it is, we ask them to put their children in this hopper of the common schools, knowing th at their brogue will be rubbed off in a year, and they will become able and good American citizens. The people of this

State and of this Union will then possess the right kind of blood, drawing it from the rich ancestry of the Old World and mixing it with the new, making this one of the greatest nations in the world. And if the children are properly taught in these common schools, no matter what their brogue was six months or a year before they entered them, they will soon be taught to snuggle up beside the American boy, and then they will march on through life as scholars and teachers themselves. After they have been here a few years, as far as they are concerned, this government will be safe; for the reason that the flag that floats above the schoolhouse is known, and the principles that it represents are appreciated by every pupil and by every teacher in the schools; and no matter whence trouble comes, whether from internal strife or from abroad, whenever the government is in danger, the boys and girls who have been taught in these schools will rally to the defense of the flag, of the Union and of the government.

This the American people have thought to be the strongest safeguard of government possible---to spend their money in educating the children in the school district, in the town, in the village, in the county, in the city, and in the State. They believe that the State, which has all these educational facilities thrown around its children buttresses the general government with the strongest kind of guarantee against all attacks.

Let me, for instance, illustrate the two forms of republics. Take France, in 1870; she was what I call a consolidated republic. The president of the republic appointed the different governors, the different mayors and the different officers throughout France, while we elect them by the people. In 1870, when the Germans wanted to take France, what did they do? They put their army around Paris, and

when Paris capitulated France lay prostrate in their grasp. They demanded an indemnity, and it was paid, and until then they would not leave Paris. Why? Because when the Germans had captured Paris they had captured all that there was of the republic.

Ours is a different kind of a republic. In 1812, the British captured Washington; they burned it; but they did not capture the republic. When the confederates, in 1861 to 1865, attempted to march round Washington, and take it, by way of Antietam and Gettysburgh, did they capture the republic? No. Why? Because the strength of this republic lay in the school district; in the village; in the town; in the county; in the city, and in the state. The farmers' and merchants' boys throughout this broad land, when the Confederates attempted to capture Washington, rallied in their might, because they knew they were living under the freest and the best government that the world has ever seen; and when they rallied to the defense of that government the enemies of the republic, instead of taking Washington, landed on the Gulf, and the Union was saved for all.

The State of New York is spending $19,000,000. for common schools, greater facilities are offered in this respect in this State than in any other State in the Union. About $7,000,000., I believe, is paid for higher education, but not by the State. When I was at the World's Fair in October, in my feeble manner trying to arouse the people of this great commonwealth to the idea that they had the greatest State in this Union, and when I happened to remark that New York was ahead of all the States of the Union in the variety of its agricultural products, and especially in its educational facilities, there was a Boston lady present, and she said: "That Governor of ours doesn't give the Almighty credit for anything!" You know, if

there is anybody around from Massachusetts, and you don't own right up that Massachusetts is ahead on educational facilities, why there is trouble right off. So, when I came home, I took up the statistics, and I found that in Brooklyn, including the Pratt Institute, in that city alone, more people had been graduated from educational institutions than in all of Boston and all of Cambridge.

As the Professor will show you, if he goes into the minutiae of what New York State has at the World's Fair, I am sure that he will make you all feel proud of our State. Why, in the cereal department, in the grains and provisions shown there, there is the prettiest and most unique show of the whole building. There is no corn-cob palace, but there are twenty-eight different kinds of wheat; there are nine different kinds of spring wheat, twenty seven different kinds of oats, eleven different kinds of barley, twelve different kinds of rye, and thirty different kinds of corn, and so on down the list. The hop culture, from the time men commence to plant the hop till they pick it and bale it, is shown there. The present generation don't know what flax is, but every grandmother in this State knows what it is; and the flax, from which linen is made is shown you from the seed that makes the flaxseed, through the different processes; and there is the hackle flax and the flax ready to be spun into thread, and from the thread into linen — all made in theState of New York, and all shown in a box not over eight by nine feet in size.

Take maple syrup and maple sugar. They seem to taste better in that little exhibit from New York State than from any other State in this Union! They look better and whiter. When I was a boy, up in a northern county of New York State (and some of you teachers have

probably heard this story), the old people up in the country, around my school district, used to say, when they would take a poor scholar and try to make him do something that he could not do, that you could not make a whistle out of a pig's tail. But I saw four of such whistles out there in our Fair exhibit. And it just shows that anything is possible with the farmers of New York State.

To my surprise I saw the New York State exhibit showing great quantities of honey, twenty two different varieties, every one of them in fine shape, and the farmers represented there seemed to me to know more about bees than any farmers in all the western prairies, where they have flowers enough to supply all the honey that could be wanted if they had the bees to do the work. But a great product of the State of New York is honey, and we had 40,000 bees in the World's Fair going to and fro from the northeast corner of that building away out on those prairies; and amid this great show of flowers and of landscape gardening that New York State gave them there (the best show of any State in the Union) these bees were gathering honey, and they gathered this summer 250 pounds of honey, and the people there said that the Governor of New York was entitled to a couple of pounds of it, and so he took it home as his part. Our bees -- New York State bees -- were out there -- not western bees! That is one of the features in the Fair. Professor, have you got that in your pictures? I presume now he will have it in. But that was to me one of the wonderful things to see. Hundreds of other things I saw, but I won't enumerate them, because the professor will give you enough to take home to your pupils, I have no doubt, to make them all better.

I am very glad to be here in this building. This is one of the

buildings for whose construction I had the honor to sign the bill. I believe it is one of those institutions which the people of New York city want. This audience that is here is a wonder to me, having been, as a business man, down in the lower part of the city nearly all my life, thinking that nothing was going on in the city except around my individual headquarters; and I presume that Mr. Constable, my old friend, who accompanied me here this morning, thinks the same way. This is a new thing to him. No, it is not; because he, with other gentlemen, has advanced this museum and enabled it to reach out through the State and do all the good it can by such a course of lectures as this and by bringing choice selections of specimens from all the countries of the world, so that the people of the United States might see them. In this way this Institution will prove a lasting good to the people of this city and to the people of this State.

I thank you for your presence here this morning, and I hope that you will all be instructed by the lecture. Having been for the last two or three weeks busily engaged in going around to the country fairs, to the different normal schools of this State, and seeing the general thrift and the general interest taken in education, I feel glad to be here at a teachers' institute, as you might call it, and hope, in the course of my next year in office, to attend more of these teachers' institutes, and see what work they are doing. I have attended many of the different colleges, and I have seen their commencements; but I must say, teachers, that at the normal schools I heard essays, from both the gentlemen and the ladies, who were graduating to become teachers, that were well up to, and some of them far in advance of the essays of those who were taking the college

course.

I will now give way to the professor.

Professor Bickmore.--I am sure I voice the sentiments of every one present when I heartily thank the Governor for his cordial and most encouraging address, to which we have had the pleasure and privilege of listening.

Our instruction that year, reached directly at the Museum, and indirectly through the institute conductors and the free lectures under the auspices of our city Board of Education and the able management of Dr. H. M. Leipziger over 100,000 of the educators and citizens of our commonwealth, as shown by the following statement:

Twenty lectures at the museum to teachers	18,000
Four "free lectures to the people" at the museum on the legal holidays	4,000
A general lecture on the World's Fair, selected from Professor Bickmore's illustrations, and delivered at 110 teachers' institutes by the five institute conductors of the State (official estimate)	50,000
A course of eight lectures given by Professor Bickmore to the members of the museum under the auspices of the board of trustees	6,000
Four lectures selected from Professor Bickmore's course on the World's Fair, and repeated at twelve different places in New York city under the auspices of the board of education (official estimate)	25,000
Total	103,000

In the regular course of our instruction upon the physical geography, geology, botany, zoology, and history of various countries, the time had arrived in 1894 for us to begin the study of the British Isles, and I prepared the schedule of subjects given in lectures Nos. 171 to 175 upon Ireland, Scotland and Wales for the autumn of that

year. During the summer I proceeded to Glasgow and journeyed through the Trossachs and the land of Burns, and thence to London where I took up the great subject: "What is her Majesty's Government doing for public education and what are the results?" Sir William Flower, director of the Natural History department of the British Museum at South Kensington and William Carruthers, Esq., keeper of the botanical collections of that great institution, kindly afforded me access to all the sources of information I desired to reach.

I soon learned that the great minds which are moulding the destinies of the British nation were all agreed in our primary and fundamental belief, namely that that individual and that community and that nation, which is the best educated will be the one which will survive in the great contest of which the labor troubles in our country and in England during that summer were but the distant mutterings of a coming tempest which will sooner or later burst upon the civilized world.

To prepare their people for this approaching storm they are bending all their energies to perfecting and extending their system of education, not only for the city of London but for the whole United Kingdom, and one gratifying result has already been achieved, namely, that during the past year there has been a larger attendance of children of school age, particularly in Ireland, than there has ever been before in the history of the Empire. I improved every opportunity during my six weeks' residence in London to attend popular and scientific lectures and examine the illustrations displayed, and I found nothing equal to the apparatus and methods we had already in use under the auspices of the State Department of Public Instruction at our Museum in New York.

From London I made excursions to Oxford and Cambridge to study those ancient universities and visited among the great cathedrals those of Canterbury, Salisbury, Gloucester, Worcester, Exeter, Ely, Peterborough and Lincoln.

I also travelled along the south coast of England down to Land's End. From Bristol I passed through the tunnel under the Severn to Cardiff and journeyed in Wales to Swansea, Aberystyth and Carnarvon, whence I made a carriage journey around Mount Snowdon and visited Bangor, Landudno and Bettus-y-Coed. Crossing the Irish Sea from Hollyhead to Dublin I traveled to Cork and along southwestern coast of Ireland to Bantry Bay and the Lakes of Killarney, and thence along the west coast to Limerick and Galway, and northwest to Londonderry, the Giant's Causeway and Belfast.

Returning to the shores of England at Barrow I journeyed throughout the beautiful lake region from Windemere to Derwent Water and the other places made famous by the poet Wordsworth.

From Glasgow I went over the Highlands of Scotland to Invernessa, and westward to the Island of Skye, which is noted for its picturesque beauty and the primitive character of its people, who were at that time celebrating the Caledonian games of their early ancestors.

Proceeding northward over Sutherland to Caithness, I completed my journey from the most southern point of England at Land's End, to the most northwestern point in Scotland at John O'Groat's house in the Pentland Fifth. At Aberdeen and Dundee I perfected arrangements for securing the views necessary to illustrate these journeys in the British Isles.

On my return to New York I found awaiting me a very cordial invitation from the President and Secretary of the Council of City and

Village School Superintendents of the State of New York to attend their annual session to be held in Buffalo, October 18th 1894, and explain to the Council how it was that many of our illustrated lectures were repeated by the science teachers in the State Normal Schools, and also in the teachers' institutes throughout the State, and to suggest how our system might be extended so that their schools also might become recipients of its benefits.

This important letter proposed the greatest enlargement of our work since it was first established by the State in 1884. I accepted the invitation and addressed the Council, giving the information desired and stated that if the necessary additional means would be provided by the legislature I would supervise the greatly extended labor without any further compensation from the Museum or the State.

The following official action was then taken:

"Council of City and Village School Superintendents of the State of New York. In annual session, at Buffalo, October 18, 1894.

"The Council having learned with great satisfaction of the development and growth of the valuable visual instruction, under the State Department of Public Instruction, in State normal schools and teachers' institutes throughout the State, through the American Museum of Natural History, and learning that Prof. Albert S. Bickmore has expressed a willingness to superintend, without compensation, an expenditure made by the State for the purpose of opening this visual instruction to the schools under the supervision of the members of this Council, the Council unanimously adopted the following, offered by Superintendent Blodgett, of Syracuse:

"RESOLVED, That the securing of legislation looking to an appropriation from the State of New York for the purpose of giving to

our schools the benefits of the line of work presented by Dr. Bickmore, be referred to the Committee on Legislation, with instruction to use every effort in their power to bring about this desired result.

(Signed) "BARNEY WHITNEY, President.

"EMMET BELKNAP, Secretary."

Among the samples of the slides which we could supply to the Superintendents, I exhibited one of the orange-red lily and one of a chrysanthemum made by Mr. and Mrs. Cornelius Van Brunt, of New York. On my recent trip to Europe I had taken special pains to enquire of all the large dealers in slides for samples of what they could produce in the form of flowers, and I purchased a few of the very best. When I arrived back at the Museum, I asked Mr. Van Brunt to come and bring the finest he had been able to make during my absence and we would compare them with the best I had been able to ther in Europe. As he displayed his reproduction of the orange-red lily, I could not conceal my surprise and delight, and I said to him, "All Europe has not been able to show me one slide that can for a moment compare with this superior work of you and your gifted wife. If now you will lay aside all other photographic work and devote yourselves solely to the manufacturing of transparencies of our native flowers, I will show my appreciation of your skill by purchasing of you all that shall be recommended by our Committee on Advice," and now I find that our records show that the number of flower-slides bought and distributed through the State during the ten years between 1894 and 1904 was nearly five thousand, and these illustrations still remain the most beautiful and most perfect in form and color of any made up to this date by the Lumiere or any other known process.

In order to aid the school superintendents further at the beginning of this new extension of our illustrated instruction, I offered them the free use of my private library for those of their teachers, who might come to the Museum in New York, to consult the volumes and pamphlets I had gathered while traveling at my own expense in the many foreign countries which I shall describe in my lectures.

In accordance with the foregoing resolution passed by the Countil of Superintendents of Schools, their committee on legislation prepared the following draft of a bill which was unanimously passed by the legislature and being promptly approved by the Governor became Chapter 362 of the Laws of 1895.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. The State Superintendent of Public Instruction is hereby authorized to furnish additional facilities for instruction in natural history, geography and kindred subjects, by means of pictorial representation and lectures, to the free common schools of each city and village of the State that has or may have, a superintendent of free common schools. The local school authorities may, in their discretion, cause the aforesaid illustrated lectures to be repeated to their artisans, mechanics and other citizens on the legal holidays and at other times. Any institution instructing a teachers' training class, or any union free school may have the free use of the apparatus provided by this act upon the payment to the superintendent of schools loaning the same of necessary expenses incurred in such use or for any loss or injury to said property.

Said superintendent may, from time to time, establish the rules and regulations and make and enter into the contracts necessary for

carrying out the provisions of this act.

Sec. 2. The annual report of each school superintendent to the Department of Public Instruction shall contain a full statement of the extent to which the instructions described may be given, and his judgment of the usefulness of the same.

Sec. 2. The sum of twenty-five thousand dollars is hereby appropriated, from any moneys not otherwise appropriated, for the preparation for and the support and maintenance of said instruction for the year beginning on the first day of January, eighteen hundred and ninety-five, payable by the treasurer upon the warrant of the comptroller, upon vouchers approved by the Superintendent of Public Instruction and audited by the comptroller; and the sum of twenty-five thousand dollars shall be appropriated annually thereafter, in the general appropriation bill, for the preparation for and the support and maintenance of said instruction for the term of four years from the first day of January, eighteen hundred and ninety-five.

Sec. 4. This act shall take effect immediately.

On the 10th of May 1895, a large representation of the sixty-six superintendents of schools assembled at Albany at the invitation of the State Superintendent, Charles R. Skinner. I was also present at his request and submitted for the consideration of the members of the council a course of study for the four years provided for by the aforesaid law.

The whole matter of aiding me in choosing the topics for our lectures, selecting the slides to illustrate each subject supplied to the superintendents of schools and other similar details, was, at [illegible] request, referred with power to a permanent "Committee on Advice", and the council selected as the members of such committee Superinten-

dents, Charles W. Cole of Albany, Charles E. Gorton of Yonkers and James Godwin of New York. As we were now about to enter upon a new era in the history of our system of visual instruction I finished my Second Series of lectures which had continued from No. 82 in the autumn of 1888 to No. 182 in the spring of 1895, and at the later date began my Third Series, which was still in full progress when my health suddenly failed me at the close of my lectures in April 1904, after a happy administration of this most enjoyable work for nine consecutive years.

On the 17th of June, 1895, an agreement was signed between the State Department and the Museum and I immediately employed the necessary assistants and began our new and widely-extended work. For the head of this corps, I had the good fortune to secure the able and experienced services of Mr. George M. Fuller, who had, for over years, been with the firm of T. H. McAllister & Co., who were at that time the largest dealers in stereopticon slides in our city.

Mr. Fuller soon became and ever remained my constant adviser and confidential friend up to the end of my labors for the State.

He supervised the difficult work of coloring our slides which were used in my lectures at the Museum and the larger work of duplicating the slides that were selected annually by the "Committee on Advice" for each of the sixty-six superintendents of schools, which comprised our list when this new system was first established. We, at first, employed only one colorist but increased the number as rapidly as we could find or educate artists, who could produce work equal to the high standard of our original series, until at the end of the nine years we had a selected corps of twenty experienced colorists.

The immediate success of this new departure is shown by the following letters from prominent educators:

Albany, N. Y., December 12, 1895.

Dr. A. S. Bickmore,
New York City.

My dear Dr. Bickmore: Professor A. F. Onderdonk of our high school gave the lecture on Niagara on Monday, December 2, to five hundred pupils of the ninth year, the highest grammar grade, and two hundred and fifty pupils of the first year in the High School, and their teachers, in all about eight hundred. He repeated the lecture on Tuesday, December 3, to the five hundred eight year grammar school pupils and all the public school teachers, making about eight hundred in all. The lecture and the illustrative slides were received with enthusiastic delight, our teachers reporting that they are sure that the whole line of lectures will be of great value in connection with their class work in Geography and History.

We hope to receive the slides for the other lectures soon, as the teachers and pupils are now eager for more mental food of the kind already furnished. Professor Onderdonk introduced Niagara by showing some fifteen slides of other renowned waterfalls. He also made a great hit by giving an idea of the magnitude of Niagara, by using city blocks for comparison in width and our City Hall tower for height. He will visit you soon and will be pleased to tell you all about it.

Of course, I enjoyed my visit at your institution and shall be glad to go again and often.

Sincerely yours,

(Signed) CHARLES W. COLE,

Superintendent of Schools.

Yonkers, N. Y., December 13, 1895.

Dr. A. S. Bickmore:

Dear Sir:

I have exhibited the views of Niagara Falls and the St. Lawrence River several times to the older pupils in day schools and evening schools also. The lecture has been given afternoons in an assembly hall which can be darkened in a few minutes at any time, and in the evening teachers and the parents of pupils have attended in considerable numbers. Next week I shall show these views in our largest hall, which will seat more than a thousand, and shall invite the parents and friends of the school as well as the older children.

Everybody is charmed with the views, which, by the way, I show on a screen much larger than the one you sent. My screen is about 17 feet square, and the lantern is quite powerful enough for the purpose.

Very truly yours,

(Signed) CHARLES E. GORTON,

Superintendent of Schools.

As an illustration of the complimentary applications that were received from educators in other states I add the following communication from the Secretary of the State Board of Education in Massachusetts:

State House, Boston, October 26, 1895.

My dear Professor Bickmore:

I expressed so strongly my appreciation of your geography work while I was with you in New York City that I have taken more leisure for that more formal expression of my satisfaction which it has been my purpose to send you.

Your views are wonderfully beautiful, and your idea of awakening

a public interest in such things as the basis for a more scholarly interest to follow, seems to me to be pedagogically sound. I should like to obtain sets of your slides, particularly of those used in the public lecture which I heard, and the private lecture which you were so kind as to give me.

Again thanking you for courtesies extended to me while in New York, I remain,

Cordially yours,

(Signed) FRANK A. HILL

At the opening of our autumn lectures on October 5, 1895, the following interesting exercises occured.

Professor Bickmore said: Teachers and Friends: I am happy to greet you as we resume our studies this year, devoting ourselves to our own State and our own country. We have many views to show you of the atmospheric envelope of our planet, so I shall not delay you with any further remarks. We have the gratification to have with us the State Superintendent of Public Instruction, the Hon. Charles R. Skinner. I know you will be happy to hear a few words from him.

Superintendent Skinner was received with applause, and made the following address:

Professor Bickmore, Teachers and Friends: For many years the American Museum of Natural History has been an object of interest to me in the work in which I have been engaged of cooperating with you, teachers, superintendents, and friends of education, in doing our duty of making it our great object in life to place the educational interests of the Empire State first among all the States of the Union, in order that this State may lead in educational as she does in commercial and financial matters.

I have known of the zeal and industry of our friend, Professor Bickmore, in the work which has been inaugurated in this institution, and it is a gratification to know that this is a part of the State Department of Public Instruction of the State of New York. It is a great gratification to embrace this department in the work of our State. I congratulate you, teachers of the City of New York, that you are so fortunate as to live in a community which has the liberality to provide an educational institution like that in which we are now assembled.

It is one of the proud monuments which the people of the metropolis have erected to education; and who can measure, who can imagine, the good which has flowed out from this institution as a result of the many object lessons which the teachers and the citizens have been permitted to see? All the world has been brought before you in a beautiful panorama. Men live upon what they feel, and also upon what they see.

This has given you a great opportunity. We are not all able to travel to the summit of the Alps, nor to the Golden Gate, nor to the far-off countries beyond the oceans; but this system brings them all before us for our study -- not for our amusement, but for our everlasting good, as a part of the education which we are receiving day by day in our associations with each other and in our contact with the world in our daily lives.

It is a great system and we owe very much to the industry, to the indefatigable work of Professor Bickmore and his associates, to the board of trustees of this institution for their liberality, their attention to duty, their knowledge of the needs of the teachers of the city and the State, and their willingness to meet those needs.

I congratulate you, teachers of New York, upon the opportunities which you have to widen and broaden your knowledge of the city, your knowledge of the State, your knowledge of the wide world in which we live and in which we are actors; and you, I know, will congratulate your brother and sister teachers, throughout the State of New York that the Legislature in its liberality has extended this system of instruction throughout the borders of the State of New York.

Heretofore the lectures here have been repeated at our teachers' institutes, held in each county of the State every year, and we have reached 50,000 people annually in thus reproducing the lectures and the views which you have seen. By a recent enactment, every city in the State, and every village in the State employing a superintendent of Schools, is entitled to the same privilege; and so the advantages which are so liberally spread out before you here, my friends, will hereafter be provided for every teacher in the State of New York.

And I glory in that fact more than in anything else, because, although we look to boards of education for direction; although we look to our superintendents for an intelligent direction of the laws of the boards of education; while we pay attention to our course of study in academies, high schools, and common schools, and much depends upon all these, yet more depends upon the teachers of the State of New York. Unless they are faithful, unless they are loyal, unless they are zealous, unless they are satisfied and happy in their work, and surrounded by good influences (and aided by good salaries let me say) our work will never be well done. The teachers are the foundation stone of our educational system.

I want -- and I have no higher ambition -- to encourage the teachers of our State to love their profession, and to teach in our

schools because they love the profession of teaching, but, more than that, because they love the boys and girls in our schools who are to take our places.

I thank you, my friends, for your generous welcome, and I can only assure you that I ask your co-operation in all that can be done to elevate the standard of education in our great State.

The encouraging attendance upon my lectures at that time is shown by the following statement:
On Washington's Birthday, February 22, 1895, more people stood at the entrances of our hall before the doors were opened at 3 P.M., than the room could hold, and over 2,000 of our citizens were turned away for the lack of standing space.

On the week of Thanksgiving Day, I spoke to the following audiences:

To Members of the Museum, on Tuesday, November 26, 1895,	800
To the People, a free lecture on Thanksgiving Day, November 28,	1,200
To Teachers on Saturday, November 30,	800
Number of different citizens present in the lecture hall of the Museum to listen to instruction in one week,	2,800

Dr. Henry M. Leipziger applied to us at this time for the privilege of purchasing, for the City of New York, one set of the slides of each of our four autumn subjects, Nos. 184, 185, 186 and 187, to be used in his free lectures to the people, which were then delivered at nearly thirty different places. This request was cheerfully granted and thus a new and very important avenue of increasing public usefulness was opened to us.

(Copy)

November 30, 1880.

Hon. Stephen A. Walker,

President of the Board of Education.

Sir,

The Trustees of this Museum having acquired large and costly collections of Mammals, Birds and specimens illustrating the Ethnology and Geology of our own and other lands, and having placed the same on public exhibition in their Museum on Manhattan Square, desire that their valuable property may be of service to your Board in educating the youth of our City. They would therefore be happy to meet a committee appointed by your Board to confer upon the best method of thus promoting this public good.

Very truly yours,

(Signed) MORRIS K. JESUP,

Chairman of Executive Committee.

(Copy of reply from Committee on Course of Study, dated Dec. 23, 1880)

"That, in the judgment of the Committee, the proposal of the American Museum of Natural History to make its admirable collection available for the Educational System of New York, deserves the acknowledgment of this Board.

That the Committee believe that the children of the Public Schools should be encouraged to visit the Museum at such time as they may have at their disposal, being convinced that even the immature or uncultivated minds of children receive most fruitful impressions from even a cursory and superficial acquaintance with the objects presented and arranged in such collections.

The arrangement of the course of studies for the schools would not permit any disposition by which the children could be allowed or encouraged to frequent the Museum on school days, and it is believed that such is not the purpose of the communication of the Executive Committee of the American Museum of Natural History.

That the very simple elements of Natural Science taught in the Public Schools, are imparted, almost entirely in accordance with the requirements of the course of study, by oral instruction, and that but little time is allowed to them. Your Committee, while not recommending any increase either in the amount of instruction in Natural Science, or in the time devoted to it, are of opinion that the existing requirements of the by-laws, in this particular, should be fully complied with. For this purpose the teachers themselves should be thoroughly instructed in the branches in question.

Oral instruction especially requires, on the part of the teacher, a thorough familiarity with the subject.

The Proposal of the Executive Committee of the American Museum

of Natural History, it is understood, embraces a plan of gratuitous colloquial lectures, to be delivered on any day that may be selected, to a class numbering about twenty-five or thirty, the course to consist of not less than six lectures. Your Committee believe that such a class could readily be formed by voluntary action among the teachers, directed by the City Superintendent, Saturday being the day selected for the lectures, when the school work would not be interfered with.

The creditable ambition displayed by the teachers who would embrace this opportunity of improvement would result greatly to their own advantage, as well as to that of the children falling under their instruction. It may be stated that the Professors of the Normal College have visited the Museum with their pupils, and profitably used the collection for illustration of their own lectures.

The Committee submit the following resolutions:

RESOLVED, That the City Superintendent be instructed to issue a circular calling attention to the collections of the American Museum of Natural History, as an educational feature, and the desirability of its being visited on Saturdays and holidays by teachers and pupils; and that he also be requested to select a class of teachers who will volunteer to attend a course of free lectures on Saturdays, to be delivered through the courtesy of the Executive Committee of the American Museum of Natural History.

RESOLVED, That a copy of the above report and resolution be transmitted to the Executive Committee of the American Museum of Natural History.

December 23, 1880.

(Copy)

Hall of the Board of Education,
City Superintendent's Office,
November 11th, 1881.

To the Principals and Teachers:

In accordance with a resolution of the Board of Education, and upon the recommendation of the Committee on Course of Study and School Books, the undersigned hereby directs the attention of all teachers to the fact that the American Museum of Natural History, possessing a large and costly collection of specimens, illustrative and useful in many departments of science, is now complete, and open to the general public for visitation and inspection. The Trustees of this Museum, through the President of their Board, Mr. Morris K. Jesup, have specially extended an invitation to the teachers and scholars of the public schools, in which invitation the desire is expressed that the Museum may be utilized in the service of public education.

The undersigned therefore suggests and advises that the means of assistance in prosecuting the study of natural science, thus courteously and definitely placed at the disposal of the schools, be rendered as available for the purpose mentioned and made as practically useful as circumstances will permit.

By frequent reference to the existence of the Museum and its many treasures in the Department of Natural History, the Principals and Teachers could and should awaken the interest of the children, and by precept and example, could induce and encourage them to take advantage of the opportunity thus presented. The fact, that teachers from the several schools have travelled great distances in inclement weather to attend a course of Saturday lectures at the Museum, and

were amply rewarded for their time and effort, is proof of the Museum's usefulness from an educational point of view; and an announcement of what had been done and is going to be done by teachers, would necessarily be productive of great effect upon the minds of the pupils. The elements of Natural Science, taught orally in our schools, are best presented by those who have an objective acquaintance with that about which they speak and lecture, and the pupil who can pass from the world of books and oral statements into actual contact with the very things of which the books and statements give only imperfect pictures, is in possession of advantages which it would be inexcusable to neglect.

Teachers and Pupils should, therefore, on Saturdays and holidays, devote some portion of their time to the Museum and its collections.

Good instruction makes discipline easy. A visit by the meritorious pupils of the class, in company with the teacher, as a reward for satisfactory service during the week or month, would not only increase the pupil's knowledge, but also constitute an effective agency in securing order, interest and attention in the class room, and would thus make the teacher's labor less arduous and exhausting.

The Museum of Natural History is in Seventy-eighth street, between Eighth and Ninth Avenues. It opens every day, except Sunday, at nine o'clock A.M., and closes half an hour before sunset.

Very respectfully,

(Signed) John Jasper,

City Superintendent.

"City Supt's Office, BOARD OF EDUCATION,
No. 146 Grand Street,
New York, February 12th, 1883.

My dear Sir:

The following is an extract from my annual report for the year 1882, which will soon be ready for publication:

"It seems proper to state that the lectures delivered by Prof. ALBERT S. BICKMORE, at the Museum of Natural History, have been productive of very good results in this department of study. These lectures, introduced about three years ago, as an experiment, have so grown in attractiveness and utility, that the class of thirty-five teachers has become one hundred and fifty, representing every Grammar Department in the system, and irregularity in attendance has almost disappeared. The Museum of Natural History thus, through the teachers, reaches the pupils of our schools, and through the latter making itself felt in nearly every household of our great city, is demonstrating its usefulness to the community at large. To MORRIS K. JESUP, Esq., Chairman of the Committee in charge of the Museum, and to the other members of the Committee, great credit is due for the commendable public spirit which they have displayed in this matter from the very beginning, and to Prof. BICKMORE, who has so ably interpreted and carried out the Committee's views, the thanks of the teachers are due for the patience, ability and kindness he has shown."

Very truly,

(Signed) JOHN JASPER,
City Superintendent."

MORRIS K. JESUP, Esq.