NEW YORK ZOOLOGICAL PARK

THE city of New York is rich, from an educational point of view, in the possession of its Museum of Natural History, its Museum of Art, its Zoological Park, and its Botanical Garden. No city in the world, with the exception of London can boast of a finer group of institutions. The love of seeing strange animals and noting their behavior seems inherent among all civilized peoples. The function of the Zoological Park is two-fold: First, it affords an opportunity for studying animals under conditions which will approximate in some degree their habitat; and secondly, afford pleasure to vast throngs who care little for the scientific side of natural history. The New York Zoological Park admirably performs this two-fold function. The scientific aspect is kept carefully in view, but the public at large are warmly welcomed to visit the collections, and they have not failed to appear in large numbers on every pleasant day since the opening of the park.

The New York Zoological Society was incorporated in 1895 under a special charter granted by the Legislature of the State of New York, the declared object of the society being the maintenance of a public zoological park, the preservation of our native animals and the promotion of zoology, and the society has now 700 members. After its incorporation the society proposed to the city that 261 acres of land in Bronx Park should be set apart as the Zoological Park of the City of New York. The city officials approved of the plan, and, in brief, arrangements were made as follows: The society was to build the animal buildings and to furnish the animal collection at a cost of not less than $250,000. These buildings were to become the property of the city by gift of the society and the city in turn agreed to furnish the ground required, prepare it for occupancy, and maintain the Zoological Park when established. The terms of the grant are equitable and the results cannot fail to prove of lasting benefit both to the society and the people of Greater New York. Like the Museums of Natural History and Art, the Zoological Park is due to individual initiative. Private citizens of generous means and public spirit have provided the nucleus, while the city really becomes a partner in the enterprise, to the extent of a part of the cost and a share in all its benefits.

To make sure of meeting all scientific requirements, especially the needs of the animals, two of the leading zoological experts of the country carefully examined the schemes for the development of the park in connection with the plan, and it was found that on the whole the ground selected for the park could hardly be better adapted to the end in view. It was surprising to find so near the built-up portion of the city a tract combining such natural beauty and ruggedness, such an abundance of mature forest trees, such an unlimited water supply and sufficient diversity of local conditions to meet the needs of nearly all the animals that it is desirable to exhibit in a zoological park. It is curious that a park with such splendid natural advantages could lie for so long a time practically unknown, and certainly wholly unappreciated.

In July, 1898, when the Zoological Society assumed control of the 261 acres forming the southern portion of Bronx Park, the site was an unknown wilderness almost as wild as the heart of the Adirondacks. It was a jungle of ragged forest, brambles, bushes, and tall weeds. There were three extensive bogs, in any one of which an elephant might easily have become entombed. The site at first would seem discouraging; poison dogwood and poison ivy grew in many places, an open sewer flowed very nearly half a mile on the surface; and there was not a drop of drinking water available, nor a seat or shelter of any kind. The Department of Parks has, however, accomplished wonders, and many of the nuisance spots have now become beautiful parts of the inclosure. The city has now laid an extensive series of walks, water pipes, sewers, and roads and has installed important drainage works, pond excavations, etc., until today more than one-half of the whole inclosure is in excellent condition.

As we have already stated on another occasion, the Botanical Garden occupies the northern end of Bronx Park, and the Zoological Park the southern end. The extreme length of the latter from north to south is 4,950 feet and its extreme width is 3,120 feet. It is roughly estimated that one-third of the land area is covered by heavy forests, one-third by open forests, and the remaining third consists of open glades and meadows. It is largely composed of granite ridges running from north to south and in places their crests are denuded. There are two important bodies of water, Lake Agassiz and Bronx Lake, whose combined area is more than 30 acres. Five of the principal basins in the park and bogs have been converted into ponds for the use of various animals. The crowning glory of the Zoological Park is the magnificent forest growth which covers about two-thirds of its area, and it should be said that only a portion of the available territory has at present been inclosed, the remainder being open to the public at all times, and it is safe to say that nowhere else, within 50 miles of New York, can there be found any more beautiful forests than those in the central and eastern portions of the park. The society has determined that all this should be kept, as near as possible, in its primeval condition, and the work of caring for it is in charge of an expert forester. Although in the corporate limits of the city of New York, the park is not really as accessible as it should be, but it can be reached from the City Hall by means of elevated and trolley railways in one hour, at an expense of eight cents, and it can also be quickly reached by the Harlem steam railroad from the Grand Central Depot. Unfortunately, access to each of the three entrances requires a considerable walk, but in time omnibuses will be run, the fare being nominal.

It should be remembered that the park is but one-third of the way toward completion, but it is interesting to see what remarkable advance has been made in one year of active work and two years of planning and organization. Let us now enter the park at the Southern Boulevard and Pelham Avenue. The first ranges are those devoted to the fallow deer, the axis deer, the mule deer and the black-tailed deer. The ranges are of ample size and are provided with a high fence of hard steel wire so strong that no animal can break through it and yet so light as to be actually invisible at a distance, thus avoiding the disfigurement of the park. Each range is provided with a shelter house for its occupants and also one or more macadamized yards or corrals into which the herds are driven whenever the ground in the ranges is so soft from excessive rains that the turf is liable to be seriously damaged by their hoofs. The deer are naturally one of the most attractive animals which can be exhibited. A winding path now leads to the Aquatic Birds' House, the Flying Cage and the Ducks' Aviary. The first is the result of an attempt to solve an old problem in a new way, the care of large migratory water birds in the most uneven winter climate in the world. The building is admirably adapted for its purpose, and like all of the other structures in the park was built by Heins & La Farge, architects. The building is 63×50 feet, and its whole central area is occupied by a large cage 16 feet wide, 38 feet long and 16 feet high. It is filled with a choice mixed collection of flamingoes, pelicans, swans, egrets, storks, ibises and ducks. The bottom of the cage contains a spacious pool of running water. Along the side of the building are two rows of cages, and on the exterior of the building there are two more series of large cages at present occupied by eagles, vultures and other birds of prey.

Case Containing Snakes and Living Plants.

Grizzly Bear Cubs.

NEW YORK ZOOLOGICAL PARK.

Between this building and the Ducks' Aviary the great Flying Cage is being completed. This is indeed one of the wonders of the Zoological Park. It represents an attempt to do for certain large and showy water birds precisely what has been done for the hoofed animals, the buffalo, the otter and other species—to give them all a section of nature's own domains; and when the birds are finally put into the cage they will fly in real freedom, for it incloses three forest trees of considerable size. The structure is 152 feet long, 72 feet wide, 55 feet high, and consists of a series of steel pipe arches and purlins over which wire netting has been tightly stretched; chain netting is used so as to afford the least possible obstruction to the eye. It contains a pool of water 100 feet long and an abundance of shrubbery. The Ducks' Aviary is 250 feet long by 143 feet wide and consists of a pond containing three islands, two of which are subdivided by low fences of wire netting into twelve separate inclosures. In the central portions of the southern island stand two rustic shelter houses, each of which furnishes shelter for the occupants of the four yards, so that each inclosure is provided with its own section of pond, grass bank, gravel banks, sanded runways, shrubbery, earth and a dry rat-proof shelter house. The fence is of peculiar construction; it consists of a rat guard which might be likened to a letter J turned upside down and attached to a letter I. This will prevent dogs, rats and weasels from passing through the fence. Beyond the Bird House are the Red Deer Range, Caribou Range and the Moose Range, and to the left of these will be built the Lion House, the Monkey House, etc., which when constructed will undoubtedly prove of the greatest popular interest. The path then leads by the elk range, which is of large extent, and one of our photographs represents a group of those beautiful animals taken in the range itself. Next to the Elk Range are the dens for the wolves and foxes, and the Aquatic Mammals' Pond lies just below these dens. Nearby the prairie dogs have a circular "Village" 80 feet in diameter, sur-

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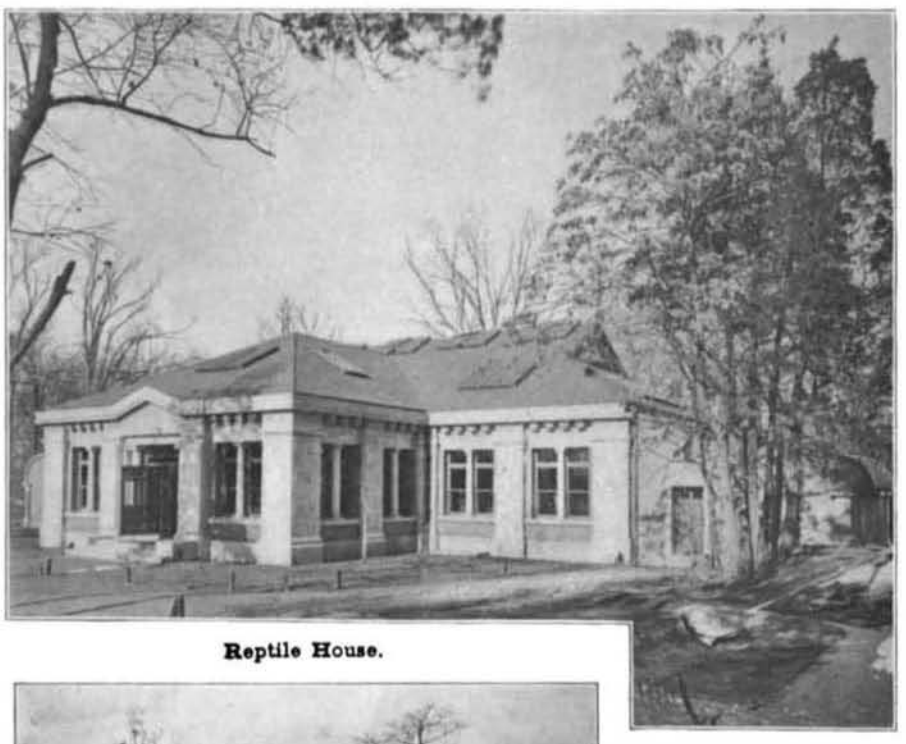
Flying Cage and Ducks' Aviary.



Reptile House.

The Elk Range.

Alligator Pool and Jungle.

Rounding Up Buffaloes.

The Aquatic Birds' Aviary.

Interior of the Reptile House.

THE NEW YORK ZOOLOGICAL PARK RECENTLY OPENED TO THE PUBLIC.—[See page 10.]

rounded by iron fences with an overhang and with walls going down to bedrock, so that there is little danger of their escape. It contains fifty fat, jolly little prairie marmots. There are also ranges for moose, prong-horned antelopes and buffalo. The Buffalo Range is of large area, comprising 20 acres of rolling meadow amply provided with shade trees. The Buffalo House is a rustic hillside barn 80 feet in length, and its flat roof is open to the public and is intended as a convenient look-out over the main range and corrals. An engraving represents the buffalo herd, which has been "rounded up" by an accommodating keeper.

From the Buffalo House we pass to the Bear Dens, passing the Rocking Stone, a colossal cube of pinkish granite, a pressure of fifty pounds exerted on one angle of which causes its apex to swing north and south about two inches, notwithstanding the fact that it weighs thirty tons. The Bear Dens are most interesting, and at present contain grizzly bears, black bears, and polar bears, the latter being great favorites on account of their being showy and active. In one of the cages are the sea lions, which are also showy animals who are constantly "on exhibition," diving, swimming, climbing, and hopping about, and no one within a quarter of a mile of them need inquire where they are, for their loud and cheerful "hook!" "hook!" is heard far and wide.

The Reptile House, which is the second important building, is one of the finest structures ever erected in a zoological garden. It is 146 feet long, and its greatest width is over 100 feet, and it cost about $45,000. It is constructed of mottled brick combined with granite and Indiana limestone. It has an ornamental cornice of terra cotta modeled by A. P. Proctor. The great central hall is unbroken by a single column, and at one end it opens across the crocodile pool into the green jungly mass of the conservatory. Nearly the whole of the tropical vegetation came from Florida along with the five alligators, the first occupants of the pool. No other zoological garden in the world has such a unique and beautiful feature in a reptile house. In the center are shallow water and salt water tanks for terrapin and marine turtles. The whole of the main hall is devoted to reptiles of the tropical zone, and the large serpents and lizards occupy one side and one end in large cages, while around the other sides are serpents and small reptiles in neat little cages with living plants, as shown in one of our engravings. Reptiles of the temperate zone are kept in a small wing which forms the entrance. The scientific museums of the United States are rich in animal collections of almost every description but reptiles and amphibians, so that the American public now has an opportunity, as nowhere else in the country, to study living reptiles.

There are at present 157 species of live animals represented in the collections, and the number of specimens is 843, 157 being mammals, 175 birds, and 511 reptiles. Up to the opening of the park on November 8, 5¼ miles of wire fence were erected, 2,470 feet of wrought iron fence were built, 9,750 feet of walk were constructed, and the installations and collections in the park have cost the society the sum of $144,227. It will require two more years of active construction to carry out the society's programme and to provide the buildings that have been planned. Among the buildings and installations for animals which are outlined in the society's programme are the Antelope House, the Administration Building, the Monkey House, the Lion House, the Bird House, the Elephant House, the Pheasants' Aviary, the Eagles' and Vultures' Aviary, the Polar Bears' Pool, the Small Mammals' House, etc.

Hon. Levi P. Morton is president of the Zoological Society. Prof. Henry Fairfield Osborn, of Columbia University, is vice-president and chief executive officer, and to him great credit is due for the success that has thus far marked the progress of this undertaking. Mr. Madison Grant is the general secretary of the society, and from its incorporation has labored unceasingly in its behalf.

The director and general curator of the Zoological Park is Mr. W. T. Hornaday, who is well known for his writings on natural history, taxidermy, and his work in the United States National Museum. Mr. Hornaday is assisted by Raymond L. Ditmers, assistant curator in charge of the reptiles, Mr. J. Alden Loring, assistant curator in charge of the mammals, and Mr. Charles W. Beebe, assistant curator in charge of the birds. The park is open to the public on all holidays, Sundays, and week days, with the exception of Mondays and Thursdays in summer, and it is open these latter days upon the payment of an admission. In summer the gates will be opened at nine o'clock in the morning and in the winter at ten o'clock, and they will be closed a half hour before sunset.

MOTOR-WHEEL FOR VEHICLES.

One of the latest and most original developments of the automobile is a motor wheel, which has recently been patented by Mr. J. W. Walters, of 302-306 W. 53d St., New York. The new device stands in a class quite by

Fig. 1.—A DETACHED MOTOR-WHEEL, SHOWING THE MOTOR, FLY-WHEEL, AND STEERING GEAR.

itself, as will be seen from the accompanying engravings, one of which shows the wheel with its motor and steering gear attached to a wagon, and the other the same motor wheel unattached. In a certain sense it may be likened to the steam locomotive; for it is entirely self-contained, and although it cannot run alone, and serves to support a part at least of the load which it draws, yet it bears much the same relation to the wagon, carriage, or other vehicle to which it is fitted as the locomotive does to its train.

The motor wheel consists essentially of a heavy wheel which is journaled in a stout yoke or forks, the head of which turns in a socket. The arrangement is similar to the front wheel and forks of a bicycle except that, instead of being controlled by a handlebar, the wheel is steered by a hand wheel, shaft and gear wheels, as shown in the illustrations.

To the right hand fork is attached a two-cylinder gasoline motor, and two gasoline tanks are carried on the other fork. The wheel is driven through a loosely mounted pinion, which meshes into a gear that is bolted to the spokes of the wheel, and a clutch mechanism, the lever for operating which is within easy reach of the driver of the wagon. The two cylinders are carried horizontally, one on each side of the fork, with the crank shaft, upon which is keyed a flywheel between them. The motor wheel is built in various sizes, from one horse power, suitable to a bicycle, up to four horse power for a carriage, or ten or more horse power for a heavy dray or truck. In attaching the motor wheel to any existing vehicle, it is merely necessary to remove the framework of the front wheels and bolt the steering socket to the body of the wagon, as shown in Fig. 2. When the motor-wheel is applied to a light vehicle, it is attached in front, thus transforming the same into a tricycle. In the case of hansom cabs, it is attached at the rear. When it is applied to the heavier vehicles, such as express wagons, coal carts, etc., two idle wheels are attached to the motor-wheel and work in unison with it.

One material advantage claimed for this system is that no reversing mechanism is necessary, the motor always running in the forward direction. If it is desired to back the car, the motor wheel is turned completely around in the steering socket and the motor started. It will be noticed that as the motor wheel is entirely self-contained and has a single point of attachment to the car, none of the twisting strains, due to the irregularity of the road, are thrown upon the motor; moreover, in case of disablement of car or motor, the ease with which a change of motor-wheels from one car to another can be made conduces to facility and rapidity of repairs.

Fig. 2.—THE MOTOR-WHEEL ATTACHED TO A LIGHT WAGON.

The January Building Edition.

The January number of the Building Edition of the SCIENTIFIC AMERICAN is one of the handsomest numbers of this periodical which we have ever issued. The colored cover shows a colonial residence at Summit, N. J., and the houses in the body of the paper are of all prices and are accompanied by plans and interior views. A special feature of the Building Edition is the publication each month of illustrations of fine buildings or pieces of sculpture at home and abroad. These will appeal to all persons of culture, as the illustrations are reproduced exquisitely, and many purchase the paper on this account. The present number contains an article on Italian gardens accompanied by four beautiful illustrations reproduced on a large scale. The editorials refer to "The Building Code of New York City;" "Exhibition of Handicraft;" "Garden Cities;" "A Move for Better Tenements." We shall be pleased to send an earlier sample number of our Building Edition free to those of our new subscribers who may not be familiar with this beautiful and unique periodical.

The Current Supplement.

The current SUPPLEMENT, No. 1253, is an unusually interesting number. "Long-Span Bridges," by Professor W. H. Burr, of Columbia University, is continued. Like the preceding installments, the paper is elaborately illustrated. "Progress in Mechanic Arts in the Last Three-Quarters of a Century" is by Dr. Coleman Sellers, and is continued in this issue. "Electrical Vehicles and Their Relation to Central Stations" is by H. M. Maxim. "The Scientific Work of the U. S. Department of Agriculture" is a résumé of the report of the year. "A Jib-headed Mainsail Sloop Ice Yacht" is by H. Percy Ashley and is accompanied by working drawings.

Contents.

(Illustrated articles are marked with an asterisk.)