

CARL HAGENBECK'S NOVEL ZOOLOGICAL PARK.

BY HAROLD J. SHEPSTONE.

If there is one individual able to speak with authority on how a zoological garden should be built and conducted it is Mr. Carl Hagenbeck, of Hamburg. For half a century now Mr. Hagenbeck has been assisting in the erection of zoological gardens in all parts of

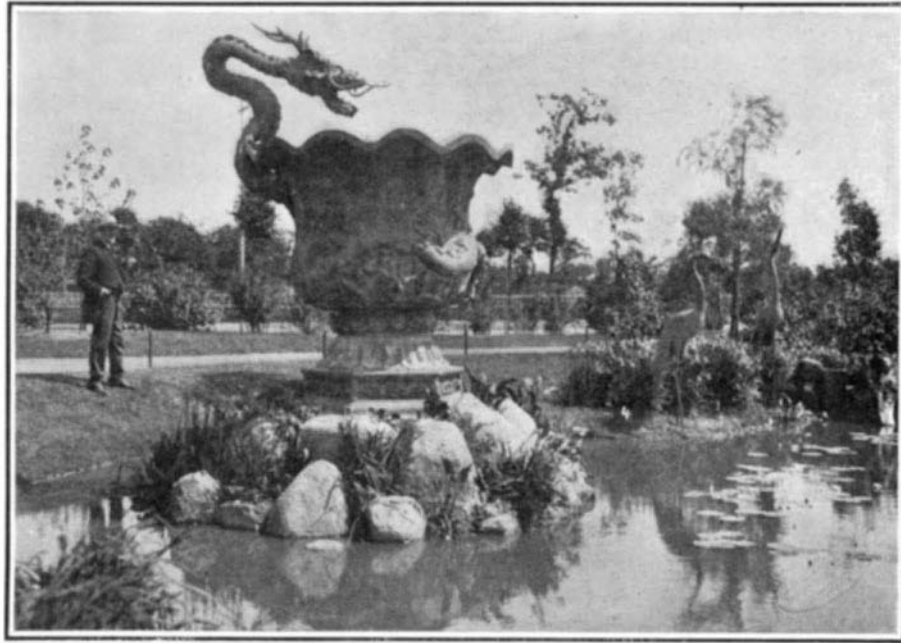
plished. At the back of the lion house, which is artistically covered all over with imitated rockwork, there is a space 60 feet wide by 45 feet deep. On three sides there are rocks which rise to such a height that no animal could possibly jump over them, while they are too steep to be climbed. The other side is absolutely open, but the animals are securely confined to

there is a distance of 30 feet. No animal could leap this, for the inclosure is so designed that it is impossible for the animals to take a running jump in that direction.

Eight lions and three Bengal tigers now occupy this inclosure. It is only right to add, perhaps, that all these beasts are tamed animals; that is to say, they



Houses and Training School for Lions, Tigers, and Elephants.



The "Zoo" is Prettily and Aesthetically Laid Out with Lakes and Fountains.

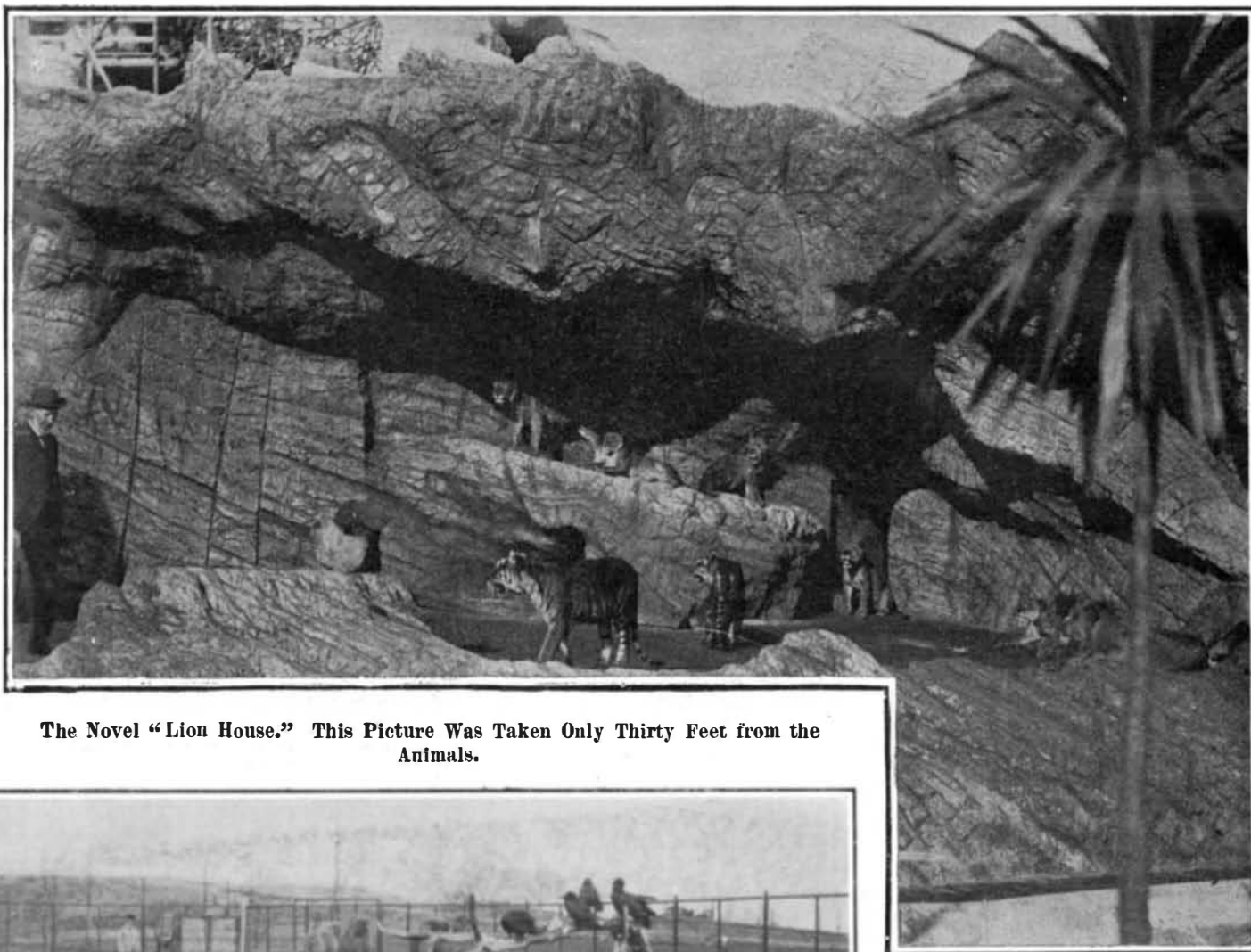
the world. He is the only individual who is prepared not only to lay out a zoological garden complete, but to stock it with animals as well. Naturally, a man who has devoted his life to the study of zoological gardens should hold opinions of his own as to how a public zoo should be designed. It has long been his wish to build a zoo after his own heart, and to-day he is happy in the knowledge that shortly his one ambition will be fulfilled. At Stellingen, a pretty little suburb of the busy port of Hamburg, he is hastening the erection of a great zoo which, when finally out of the builders' hands, will be one of the sights of Europe, if not of the world. It was the writer's privilege to spend a few days with Mr. Hagenbeck as his guest recently, and to inspect for himself this novel zoo. He also witnessed the placing of some of the lions and tigers in what is undoubtedly the most unique lion "house" ever designed and constructed.

Briefly, this wonderful zoo occupies thirty-six acres of ground, though the proprietor has arranged to throw another twenty-six acres into the park if desirable. But it is the bold and even daring manner in which it is being laid out that calls for special attention. Here you can gaze at lions, tigers, and other wild beasts appearing to the naked eye to be entirely in the open, no iron bars or netting interfering with your view. A description of the lions' quarters will give an idea of how this is being accom-

plished. At the back of the lion house, which is artistically covered all over with imitated rockwork, there is a space 60 feet wide by 45 feet deep. On three sides there are rocks which rise to such a height that no animal could possibly jump over them, while they are too steep to be climbed. The other side is absolutely open, but the animals are securely confined to

are accustomed to the presence of their keeper, who can move freely in and out among them. Should an animal by any chance fall into the ravine, it can regain its den by a series of inverted steps at one end of the ditch.

Another interesting sight in this novel zoo is the artificial mountain where ibex, mountain sheep, goats,



The Novel "Lion House." This Picture Was Taken Only Thirty Feet from the Animals.



A Group Composed of Camels, Yaks, Llamas, Goats, Sheep, Cranes, Geese, and Other Birds.

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and deer disport themselves. These mountains are virtually masses of imitation rocks, piled one on top of the other. In all there are some eight of these mountains, and they tower in height from 60 to 150 feet. To watch the ibex climb the steep sides and jump from one precipice to another is a fascinating spectacle. The rocks were erected by Mr. Eggen-schwylter, a very skilled Swiss expert and sculptor. A framework of timber and poles was built on pillars of brickwork. The whole structure was then covered with a layer of thick cement. The rocks are so arranged that the animals can climb to the highest points. To prevent their

slipping, small and large pieces of granite stones have been put into the cement, to afford the animals a firm foothold in climbing during frosty weather.

When completed, the garden will really consist of four distinct sections. The first of these will be devoted to all kinds of aquatic birds. The second section will be reserved for graminivorous animals. It will be replete with camels, dromedaries, yaks, llamas, ostriches, etc. The third section, now finished, is the open-air lion inclosure for the big cats. The last section is the artificial mountains which have been described, and which rise behind the lion house. On the top of the latter Mr. Hagenbeck will place large eagles and vultures, and these birds will move apparently at liberty, being only fastened by thin chains. Standing, therefore, in front of the first section, namely, the lake upon which will be placed the waterfowl, the visitor will be confronted by a wonderful panoramic view of wild animal life, for he will be able to see at one time the whole of the four sections and the animals confined within them, some 600 birds and mammals in all. This vast collection of animals will appear to be able to roam about of their own free will, for the visitor will be unable to detect the ditches and other cunningly devised arrangements that will confine the animals to their allotted inclosures.

The garden is not expected to be finally completed until April next, but when it is, there will be other novelties in addition to the panoramic view of animals already described. Not the least interesting of these will be an Arctic landscape, showing an iceberg supposed to be stranded on a rocky coast. At the foot of this iceberg polar bears will disport themselves. To the right of this there is a large basin where seals and sea-lions will congregate. Immediately behind them, on raised ground, reindeer will roam. Then there will be a group of native villages populated by races from all parts of the world. There will also be an extensive playground for children, where they can amuse themselves in gymnastics or games of all kinds. To provide further amusement for young and old, Mr. Hagenbeck will arrange that a number of elephants, dromedaries, camels, small ponies, and dwarf donkeys will be available for rides, as well as sundry vehicles drawn by antelopes, llamas, ostriches, and Shetland ponies. There will also be a restaurant and a concert room.

"My whole idea," said Mr. Hagenbeck, "is to erect a zoological garden in a natural manner. I shall place my animals in surroundings as much like their natural haunts as possible. I fully believe that hitherto animals have been too cramped in our zoos, and also not allowed enough open-air exercise. I shall give my animals here plenty of room to move about freely in their inclosures, and also keep them in the open air as long as possible. Fresh air is necessary for every living creature, and I feel convinced that one of the faults of present-day zoos is the keeping of animals in heated houses—animals, I mean, that could easily become acclimated. I feel sure, too, that zoological gardens of the future will be erected on this plan. Already, commissions from the United States, South America, and Japan have arranged to come here in the spring and inspect the park."

Some Curious Misconceptions.

BY THALEON BLAKE, C.E.

It is customary to accept without question old folks' sayings, and even popular views of mechanical operations and of chemical phenomena. A little observation, or a few experiments, will disprove or confirm many of these. The laws of physics are simple, and easily understood, yet many people, who would know better were they to think about what they so credulously accept and repeat, are deluded to an extent which would, no doubt, be laughable to themselves if they could see clearly.

For example, it is often asserted that water on bituminous coal both aids combustion, and "makes the coal last." Housewives, office men who live where this coal is used, and who are compelled to maintain stove or furnace fires, are firm believers, as a rule, in this paradox. That water on coal cannot do both, these people would know if they but thoughtfully considered it a minute. The facts are these (and any one may easily verify them): In a light fire, that is to say, a stove or house furnace, water sprinkled on large lump-coal really causes it to burn more rapidly. It soaks into the strata, into the porous surface, and,

being there converted into steam, the lump is split into parts, or the surface becomes corrugated and cavernous, thus offering a larger area of carbon to the active oxygen of the air. If the water is in excess of the amount which will do this, it then no longer aids combustion, but retards it. Again, if the coal is fine, a small dampness, nothing approaching wetness, however, may increase combustion by holding the particles apart, thus permitting the air to be admitted. In short, water on coal favors combustion, when it does favor it, only by assisting the oxygen of the air to find more ready access to the surfaces of the carbon.

Of course, where the fire is large and hot, the draft strong, and oxygen or hydrogen affinities other than carbon are in presence, then water may be decomposed into its gases $= 2H + O$. If the heat is extreme, unstable compounds and environment suitable, the anom-



Artificial Mountain for Ibex, Mountain Sheep, and Goats.

aly is witnessed of water causing fire to burn fiercely, with great show and crackle, by furnishing inflammable gases.

A man, who burned coke in his furnace, obtained his supply from a local gas works. He complained that the furnace was at fault. Fires were hard to make, and never grew vigorous. He told me his troubles. I asked him the color of his coke; he said it was dark. Then I recommended him to ask for dry coke. He said his coke was dry. But the interior of air-cooled coke is usually a beautiful steel-gray, water-cooled coke dark and uninviting to the eye. He investigated, and found that the workmen at the gas works sprinkled the glowing coke to cool it as soon as it was withdrawn from the retorts, thus adding



Tame Zebras Broken to Harness.

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25 to 50 per cent to its weight. They "watered their stock," but honestly, as the foreman was convinced that, if anything could, water was sure to "aid combustion." The furnace was thus exonerated.

Perhaps every professional man, whose work has brought him into contact with "practical" men of the trades, has been struck with the ingenuity of many of their "secrets." But not always does their practice succeed. To be sure, theory and practice are not synonymous; success may not come to practice based on theory. But theory is an excellent thing with which to be acquainted when practice is being investigated. I once knew a foreman of a machine shop who was positive that all he had to do to keep the demon rust from devouring steel parts to lathes, and so forth, was to dust them with quicklime. I did not like the chemical equation which ensued when calcium

oxide was exposed to air in which moisture was liable at times to permeate. But the foreman was certain; and, indeed, his steel thus protected *was* protected. Some other machinists in other shops and in other cities, used the same means to prevent rust. All of these said that it worked well. Many, however, either did not use it or had no faith in it. Meanwhile, the foreman of whom I first wrote, went to another shop, where he learned that there was an atmospheric condition in which quicklime did not prevent rust. He was astonished. Together we experimented. The chemical equations are: $CaO + H_2O = Ca(OH)_2$. But calcium hydroxide absorbs carbonic acid gas— $Ca(OH)_2 + CO_2 = CaCO_3 + H_2O$. It was this last H_2O which made me question the utility of thus preventing rust. We came to the conclusion that this H_2O evaporates in a dry atmosphere, and leaves no rust marks, *provided* that the CaO is renewed often; that it itself causes rust if the $CaCO_3$ is old and the atmosphere not uniformly dry; that as a rust-preventer, quicklime is neither infallible nor the best under the most favorable circumstances. For it is self-evident that a substance which prevents rust by absorbing the moisture on the steel, may in the end be harmful, since it eventually gives off moisture when its final chemical transformation is consummated.

In conclusion, many ludicrous mistakes are daily committed even by persons whose educational advantages have been exceptional. A lawyer, whose scholastic career had been exceptionally long and full of honors, became the victim of a liver complaint for which, as part of the treatment, his physician prescribed calomel and soda, in tablets. The apothecary from whom he purchased the tablets placed a label on the bottle, on which was printed "Mercurous Chloride (mild), 1/10 gr. with Soda Bi-carb. 1 gr." These used, the man of many degrees, given

him by colleges of note, happened to wish to buy more tablets when away from home. The second druggist furnished a label exactly like the first, except for the omission of the word "mild." The lawyer refused to take them, alleging that, as his complaint was not yet dangerous, the "mild" tablets were amply strong enough for him. No argument, no explanation which the druggist advanced had any weight with this skeptical customer. When the lawyer returned to his home, he proudly told his physician how his acuteness had penetrated the second apothecary's evident desire to substitute strong tablets for a mild kind! The distinction which *mild* was intended to convey, it is hardly necessary to explain as it will occur to all readers, is that between *mercurous* and *mercuric chloride*, calomel and corrosive sublimate, a common medicine and a deadly poison.

The habit of thinking of causes and results, of reasoning about phenomena, is what, applied to mechanics, makes inventors; applied to physics and chemistry, makes discoverers; and, lastly, applied to every-day details, makes them interesting and us ever-developing students in the mysteries of Nature and of Life.

Reactions of Bearberry Leaves.

The following reactions form a useful means of distinguishing bearberry leaves from their chief adulterants: On two rows of slides lying on a piece of white paper place drops of vanillin-hydrochloric acid and drops of fresh solution of ferrous sulphate; introduce into each a section of the leaf to be tested (it being of no consequence whether the section is thick or thin, longitudinal or transverse). In vanillin-hydrochloric acid sections of *A. uva-ursi* and of *V. vitis-idaea* develop a crimson color due to the presence of a glucosidal tannin, while those of *B. sempervirens* and *V. myrtillus* produce scarcely any color. With ferrous sulphate the liquid in the case of *A. uva-ursi* becomes bluish-black, while with the others it is scarcely colored; the section of *A. uva-ursi* becomes at the time black, that of *B. sempervirens* remaining uncolored, and those of *V. vitis-idaea* and *V. myrtillus* being darkened. It is thus possible to distinguish bearberry leaves from these possible substitutes without the aid of a microscope.—Pharm. Ztg.

A reinforced concrete standpipe, 50 feet in diameter, 106 feet high from the inside of the bottom of the tank to the top of the cornice, and with a capacity of 1,500,000 gallons, has been completed and is in service in the waterworks system of Attleboro, Mass.