

THE GLASGOW EXHIBITION.

The International Exhibition at Glasgow, opened by the Prince and Princess of Wales on May 8, is the largest that has been held in the United Kingdom since the London International Exhibition of 1862. The buildings and grounds occupy sixty-six acres, in the Kelvin Grove Park, the main entrance, facing northeast, being nearly opposite the Glasgow University buildings, which are on Gilmore Hill, on the other side of the stream. From that direction the grounds are reached by a broad esplanade from a gateway in Bank Street, Hillhead; but the Exhibition Palace can be entered immediately either on its east side, in Gray Street, or from Sandyford Street, in the center of its south side. The building is 1,300 feet long and 265 feet wide, comprising a nave and transepts, with an iron dome 170 feet high and 80 feet in diameter, and with ten towers, which are 200 feet high, and are partly of brick. The remainder of the building is chiefly wooden.

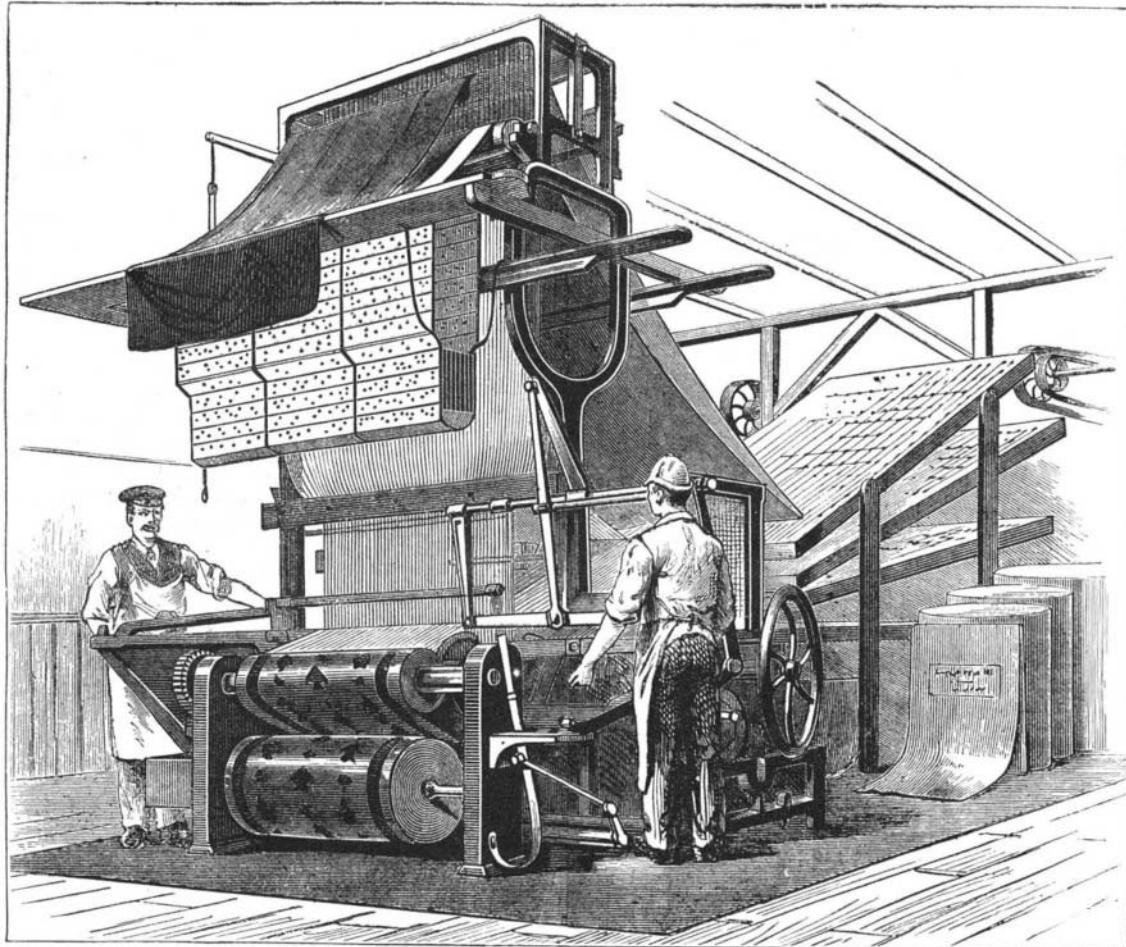
It is in the Saracenic or Moorish style of architecture, with arches of horse-shoe form, polygonal domes or cupolas, minarets and pinnacles, and appropriate decoration, painted internally with a rich cream color, relieved by deep red and rich dark brown, except the dome, which is painted red, blue, yellow, and green, and its framework apparently gilt. The main avenue, from east to west, is more than a quarter of a mile long, 60 feet wide, and 43 feet high. The transepts, from the grand entrance to the south entrance, are 215 feet, and of the same width as the nave. The dome, rising from four substantial towers, is well proportioned. Its converging arches are adorned with the armorial bearings of Great Britain, France, Germany, the United States, Canada, Australia, South Africa, and India, and on circular panels below are four allegorical figures—Science,

Art, Industry, and Agriculture. Scripture texts, speaking of the manifold works of God, and acknowledging that the manifold works of man are the gift of God, are inscribed over the four great arches under the dome. In the center is a fountain, with a circular promenade around it. A chandelier with eight electric lamps gives it light in the evening.

Gallery occupying a substantial brick-walled part of the building, made fireproof, and which may be permanent. At the west end of the main avenue, beyond the principal building, and north of the line of its front, is the Machinery Annex, 330 feet long and 286 feet wide.

The buildings altogether cover a space of 474,000 square feet, of which 268,000 feet are devoted to general exhibits of the various classes (manufacturing and commercial and articles of produce), 27,500 feet to the Fine Arts, 16,000 feet to the grand hall, 23,000 feet to dining and refreshment rooms, and 140,000 feet to machinery, boiler sheds, and the like. Messrs. Campbell, Douglas & Sellers, architects, of Glasgow, and Mr. James Barr, C.E., furnished the design for these buildings. Messrs. W. Shaw & Sons, of Glasgow, were the contractors.

The different classes of articles in the Industrial Exhibition follow much the same order as that with which everybody is now familiar. For example, agriculture, mining and quarries, engineering, shipping, machinery, carriages, cutlery, chemistry, food and liquors, textile fabrics, paper and printing, furniture, pottery and glass, jewelry, clocks and watches, fisheries, education, and musical instruments, each subject with others allied to it. We give an illustration of carpet weaving, as shown in practical operation at the exhibition.—*Illustrated London News.*



THE GLASGOW EXHIBITION—CARPET WEAVING.

At the east end of the main avenue is the grand hall, 200 feet long, 96 feet wide, and 60 feet high, with side galleries, an orchestra, and a fine organ, built by Messrs. J. W. Walker & Sons, of London. The decoration is in red and yellow, with festoons of red and blue cloth, fringed, heraldic shields and trophies, and canvas panels, filled with colored ornamentation of Moorish patterns. To the south of the grand hall is the Fine Arts Section; the Picture Gallery and the Sculpture

A FEATURE of building construction at the present time is the extensive employment of enameled brick. These are used in places exposed to moisture, or where contaminating vapors are present in the air. The great superiority of such brick to painted brickwork in kitchens, laundries, courts, areaways, etc., is unquestionable.



THE GLASGOW EXHIBITION—VIEW FROM UNDER THE CENTRAL DOME.

Comparison between the British and French Navies.

Lord Wemyss has just issued an interesting and important document, in which a comparison is instituted between the British navy and the French navy. The papers have been drawn up by Sir Spencer Robinson, and one of the appendices has been annotated by Admiral Sir Thomas Symonds, whose interest in this subject is well known, and who has himself contributed to the dissemination of information upon it. The method adopted in the tabular statements which form the main part of the papers is to divide the *armored* fleets of either country into four classes. The results of this division may be generally summarized:

CLASS A.—Ships universally considered fit for purposes of modern warfare at sea.

| ENGLAND. | FRANCE. |
|--|------------------------------------|
| Types, Ajax, Devastation. 27 ships. | Type, Admiral Baudin. 22 ships. |

CLASS B.—Ships fit for coast defense, but not for sea.

| ENGLAND. | FRANCE. |
|----------------------------|----------------------------|
| Type, Glatton. 9 ships. | Type, Cocyte. 11 ships. |

CLASS C.—Fit for general service at sea, but obsolete in respect of power.

| ENGLAND. | FRANCE. |
|--------------------------------|----------------------------|
| Type, Bellerophon. 6 ships. | Type, Marengo. 6 ships. |

CLASS D.—Unfit for war, but capable of being used for some purposes.

| ENGLAND. | FRANCE. |
|------------------------------|-----------------------------|
| Type, Minotaur. 13 ships. | Type, Rewanche. 8 ships. |

The totals which result from this classification are:

| | |
|--------------------|-------------------|
| England, 55 ships. | France, 47 ships. |
|--------------------|-------------------|

The unarmored fleets of the respective countries are thus tabulated:

| ENGLAND. | | FRANCE. | |
|------------------|-----------------|------------------|-----------------|
| Speed in knots. | No. of vessels. | Speed in knots. | No. of vessels. |
| 20 | 2 | 25 | 1 |
| 18-20 | 13 | 22 | 9 |
| 16-18 | 18 | 20 | 2 |
| 10-16 | 86 | 18-20 | 11 |
| | | 16-18 | 7 |
| | | 10-16 | 76 |
| | 119 | | 116 |
| Armored cruisers | 12 | Armored cruisers | 5 |

The text of the memorandum contains a number of criticisms upon the existing naval administration. Some of the points, with added comments by Sir Thomas Symonds, are amply confirmed by the results of the naval maneuvers, as, for example, the criticism that a blockade is only effectual with a very superior force and a grand reserve. When one comes to compare the amount of protection afforded by the British navy to British commerce with that afforded by the French navy to French commerce, one arrives at the startling result that the proportion of war steamers to merchant steamers is in Great Britain 1 to 90, and in France 1 to 10. In the beginning of this century, the proportion in Great Britain was about 5 to 90 instead of 1. The conclusion of the whole matter is that Sir Spencer Robinson and Lord Wemyss recommended the addition to our navy of at least six battle ships (Admiral Symonds says eighteen), sixty first-class swift cruisers (Admiral Symonds says one hundred), a host of colliers, and an extension of electric cables. No estimate is given of the cost of these additions, but, for the smaller figures, it may be set down roughly at somewhere about \$100,000,000 on the lowest estimate.—*Industries.*

Electric Light Patent.

United States Circuit Court, District of Massachusetts, in Thomson-Houston Electric Company vs. Citizens' Electric Light Company *et al.*, decided August 14, 1888. Holt, J.

This suit is brought for the infringement of letters patent No. 238,315, granted Elihu Thomson and Edwin J. Houston, March 1, 1881, for improvements in current regulators for dynamo-electric machines. The specification says:

"The object of our invention is to provide improved means for controlling automatically the strength of an electric current flowing over a circuit composed of a dynamo-electric machine and one or more electric lamps or other appliances, through which the current passes, and to obtain said control without the introduction of resistances as such, and without varying the speed or field of the dynamo-electric machine, and at the same time, if desired, to utilize the reaction principle for the magnetization of said dynamo-electric machine, or in other words, to cause the current generated to pass the field magnet coils. We accomplish these results at the same time that the power expended to drive the dynamo-electric machine varies directly in accordance with the changed resistance of its circuit, being less as the resistance is less, and greater as the resistance is greater.

"In the improved system of operation provided by our present invention, we possess the ability to cut out lamp after lamp from circuit, and yet maintain a uniform current strength in the remaining lamps and economy of motive power proportional to the diminished resistance, while the normal light-giving power

of each lamp not cut out is maintained, and an absence of heating or necessity for any other adjustments than those at the commutator of the machine obviated. These adjustments are preferably made automatic, for we find that with the commutator used by us, as herein specified, a proper adjustment of the commutator being effected when a certain resistance is in circuit, a similar adjustment will, when the resistance is changed, give the same current. In our system we have employed a dynamo-electric machine in which the commutator is constructed of three insulated segments of a ring connected to three armature coils. The collecting brushes applied to said commutator are supported so as to be movable around the commutator without changing the relative positions of the two collectors. This movement of the collecting brushes is well known in the art.

"We find in practice, moreover, that we obtain with this automatic regulation of the current strength an independence of speed variations in the machine, it being only necessary to so adjust the speed of running that when the speed is at its lowest, the machine shall yet be sufficient in power to maintain the number of lights placed in its circuit. We are therefore able to operate successfully under conditions of motive power variations that have hitherto been recognized as fatal to steadiness of light obtained.

"In United States patent No. 223,659, January 20, 1880, before referred to, we have described a means of automatically adjusting the commutator collectors of dynamo-electric machines, which method is adaptable to the present case of current regulation.

"Our present method of operating, therefore, so far as it relates to automatic regulation, is based upon the same principles of operation as our previous invention, and it consists in an improved construction and mode of use of the apparatus employed in patent No. 223,659.

"We claim:

"1. In a current regulator for a dynamo-electric machine, the combination of a device responding to changes in the main or generated current, a shifting commutator for said machine, and mechanism controlled by said responsive device to shift the commutator to those positions where the current taken up by said commutator shall be constant.

"2. In a current regulator for a dynamo-electric machine, an electro-magnetic device acted upon by variations in the main or generated current, an adjustable or shifting commutator for the machine, and mechanism controlled by said electro-magnetic device to adjust the commutator to those positions where the main or generated current taken up by said commutator shall be constant."

The main defense in this case is that the prior patent, No. 223,659, issued to these complainants, is an anticipation of the patent in suit. Upon careful examination of the two patents in connection with the testimony of experts and the able arguments of counsel, I cannot agree with the position taken by the defendants. The object of the two patents, as disclosed by their titles, is different.

The patent in suit is for a current regulator for dynamo machines, the earlier patent is for an automatic adjuster for commutator brushes on magneto-electric machines. Current regulation, or "to provide improved means for controlling automatically the strength of the electric current," is the object of the patent in suit, while the object of the prior patent was the construction of an automatic adjuster for commutator brushes, "whereby an automatic adaptation to variations of circuit resistance is secured, and the burning and destructive effects of false adjustments obviated." The design of the present patent is to adjust the commutator to those positions which shall keep the current constant, the design of the prior patent was to adjust the commutator so as to keep the current at its maximum value, or in other words, to adjust the brushes so that their contacts with the commutator segments should be at the neutral points, by which means the difficulty from sparking would be reduced to a minimum. It is true that the means employed in both patents to accomplish these different results bear a close relation to each other. The patentees declare that the earlier method described is adaptable to the present case of current regulation, but they also say that their present method consists in an improved construction and mode of use of the apparatus employed in the prior patent. To construct an automatic adjuster which shall avoid sparking or leakage by bringing the brushes in contact with the commutator segments at the neutral line, or the points of the maximum difference of potential between the segments, and, therefore, of maximum current, may be an important invention, but it is certainly quite a different invention to adjust the brushes of the commutator to positions which shall keep the current constant, independently of the question whether the brushes touch the segments at the neutral points, or whether sparking is avoided.

It is said that the present invention is shown in Figs. 1 or 2 of the earlier patent. The testimony of defendants' experts seems to find the invention described in Fig. 1, while the learned senior counsel for

defendants appears to reject this contention and turns to Fig. 2 as an anticipation of the patent in suit. I do not find in Fig. 2 of the earlier patent the combination of mechanism which forms the subject matter of the claims of the patent now under consideration. I do not find that which constitutes the important thing in the present invention, namely, the responsive device responding to changes in the main or generated current. In respect to Fig. 1, the most that can be said is that it imperfectly describes that which was perfected in the subsequent patent now in controversy. It seems to me in other words that the language of the specification is strictly accurate where it declares that the present invention "consists in an improved construction and mode of use of the apparatus employed in patent No. 223,659."

Upon the subject of infringement I have no doubt. The question is not as to the form of dynamo the defendants may use or whether their machine may be adjusted by hand to avoid sparking, but the question is whether they use the complainants' invention by the employment of substantially the same means to accomplish the same result, namely, the regulation of the current by means of a device responding to changes in the main or generated current, and this the complainants have shown.

Let a decree be entered as prayed for in the bill.

Decree for complainants.

It is said the right to use the dynamo regulator, which was the bone of contention in the suit won by the Thomson-Houston Company against the American Company, is worth \$1,000 a day.

The Leper Settlement on the Island of Molokai.

It is probably known to every one that leprosy exists to a considerable extent in the Sandwich Islands, but few, except those specially interested in the subject, know to what an extent it exists there, or what are the measures in force to isolate the sick and prevent the spread of the disease. In the biennial report of the president of the Hawaiian Board of Health we find an account of the leper settlement by Mr. R. W. Meyer, agent of the Board of Health in Molokai, from which the following facts are taken.

The settlement is on the island of Molokai, to which all lepers are sent as soon as their disease is recognized. On the first day of April, 1888, the number of lepers on the island was seven hundred and forty-nine, of whom four hundred and ninety-two were men and two hundred and fifty-seven women. It is curious to note that among this number were six British subjects, two Germans, one American, one Pole, one Belgian, and one Russian. Custom, and a bad custom it would seem, allows the relatives and friends of the sick to live in the settlement as long as they desire, and to leave it whenever they tire of their surroundings. Of these relatives and friends, called "kokuas," there were one hundred and forty-four. In addition to these there were forty-nine of the original inhabitants of the island or their descendants, called "kamaainas," who had not yet been driven away by their unwelcome neighbors. The entire population of Molokai, at the time of the report, was, therefore, nine hundred and forty-two. Of the buildings on the island in addition to the cottages of the residents, there are twelve hospitals, two dispensaries, one house for the resident physician, one prison (with accommodations for two inmates), one receiving house for new comers, one store, and five churches, of which two are Catholic, two Protestant, and, curiously enough, one Mormon. The total number of buildings is three hundred and seventy-four, of which two hundred and sixteen are owned by the sick or their friends.

The lepers, and the children born of leper parents at the settlement, are supplied with rations by the government, and also receive a bill annually which enables them to obtain at the store six dollars' worth of clothing, which is probably sufficient for the necessities of a warm climate. They are allowed to compound their rations for cash, if they so prefer. They also receive each half a bar of soap a month, and to every house or family is given one quart of kerosene oil per month.

There are certain defects in the management of the settlement which, if leprosy is a contagious disease (and the weight of medical opinion is in favor of that view), are to be accounted very serious and call urgently for remedy. The most important of these is the fact that "kokuas," the friends and relatives of the sick, are allowed to reside on the island as long as they choose, and then to leave whenever they desire to return to their homes. In this way, assuming that the disease is contagious, they spread it about and render null all the efforts made to repress leprosy in the islands. Another reform that is called for is the removal of paid nurses and attendants, and the substitution for them of sisters and others who are ready to devote their lives to the care of the sick, with no thought nor desire of returning to the outside world after having amassed a comfortable sum by the accumulation of their salary. That the management of the lepers, as far as they are themselves concerned, is to be commended, is evidenced by a letter addressed to Father Damien by Dr. Woods,

in which he says that, after having visited every one of those places where the disease prevails, he has not found the people so happy, so well taken care of and attended to as the leper settlement on the island of Molokai.—*Medical Record.*

The Sound of Thunder.

One of the most terse and succinct descriptions of a natural phenomenon is that recently given by M. Hirn, in which he says that the sound which is known as thunder is due simply to the fact that the air traversed by an electric spark, that is, a flash of lightning, is suddenly raised to a very high temperature, and has its volume, moreover, considerably increased. The column of gas thus suddenly heated and expanded is sometimes several miles long, and as the duration of the flash is not even a millionth of a second, it follows that the noise bursts forth at once from the whole column, though for an observer in any one place it commences where the lightning is at the least distance.

In precise terms, according to M. Hirn, the beginning of the thunder clap gives us the minimum distance of the lightning, and the length of the thunder clap gives us the length of the column. He also re-

TWO NOVELTIES IN THE ZOOLOGICAL GARDENS.

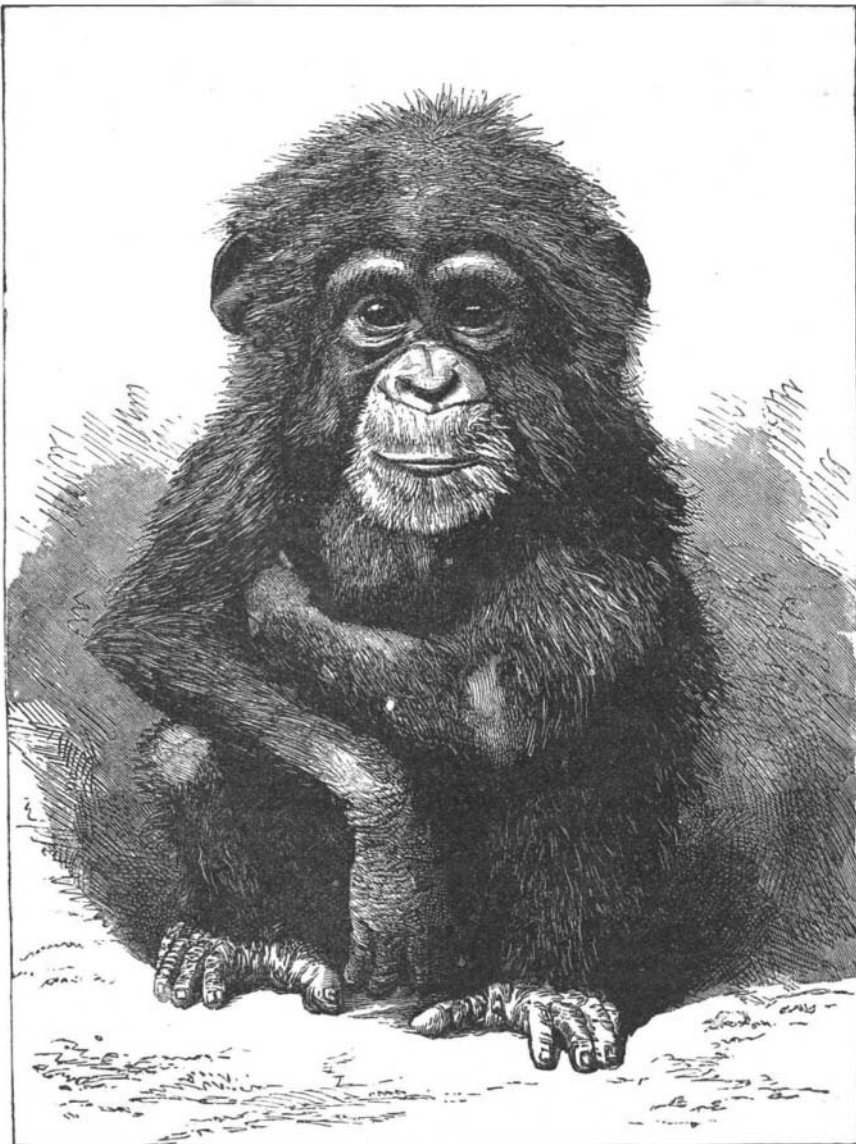
The young chimpanzee, one of the most recent additions to the Zoological Gardens, London, arrived from Sierra Leone some weeks since. It has been deposited with the society by Mr. Swanzy, Mr. Clarence Bartlett, the assistant superintendent of the gardens, going to Liverpool to meet his new charge and bring her to London. On her arrival in the gardens she was placed in the apartment adjoining that occupied by the well-known "Sally." Although the society at various times has received nearly forty specimens of this species of anthropoid ape, nearly all of them have arrived in such a sickly condition that they have been unable to withstand the rigor of our climate for more than a few days. About fourteen years ago one known as "Joe" lived for three years, and "Sally" has been in the gardens for five years. These two cases, however, are very conspicuous exceptions, and all interested in the matter will therefore be glad to hear that "Jennie" arrived in good health and spirits, apparently none the worse for her journey. If her owner intends leaving her with the society, which, as her chances of life are greater under the experienced care she will there receive, it is hoped he will do, the keepers, having such a good start, may succeed in rearing her. None

tors" having "sat upon" it, it was decided to bring it up on raw beef juice, on which diet it apparently thrived. It had for some time as its playfellow a little pariah puppy, which was called "the poor companion." The dog was not in the least afraid of the cub, although the latter often jumped on its playmate as if about to kill it. The little puppy, however, would drive the aggressor off with a snap and a yap, and showed itself the master. The cub was brought to England by Mr. E. J. Buck, of Dhariwal, Punjab, in the P. and O. steamer Ballarat. It is quite tame, and was an immense favorite and pet among the passengers, one American gentleman offering a large sum for it. It was first taken to Dr. Buck's house at Clapton, where it played with his children in the garden, and on the 13th of August was conveyed to the Zoological Gardens.—*London Graphic.*

Death of the Central Park Chimpanzee.

Remus Crowley, the remarkably intelligent monkey of Central Park, New York, died there on the 31st of August last, greatly to the regret of the children and the thousands of people who were in the habit of visiting our city zoological collection.

The animal evinced great aptitude in acquiring



YOUNG CHIMPANZEE FROM SIERRA LEONE.



TIGER CUB FROM INDIA.

marks that when a flash of lightning strikes the ground, it is not necessarily from the place struck that the first noise is heard. Again, he points out that a bullet whistles in traversing the air, so that we can to a certain extent follow its flight, the same thing also happening with a falling meteorite just before striking the earth. The noise actually heard has been compared to the sound produced when one tears linen. It is due, really, to the fact that the air rapidly pushed on one side in front of the projectile, whether bullet or meteorite, quickly rushes back to fill the gap left in the rear.

An Alleged Cure for Whooping Cough.

Dr. Mohn, according the *Revue Mensuelle des Maladies de l'Enfance*, May, 1888, claims that he has in a number of cases produced instant and permanent cure of whooping cough by fumigations with sulphur. His method of procedure is as follows :

In the morning the children are clothed and removed from their sleeping room, in which are hung all the clothing, toys, and, in fact, everything with which the children are brought in contact. In this room about four ounces of sulphur for every cubic yard of space is ignited, and the sulphurous acid allowed to remain in the room for about five hours. The room is then well aired, and the next evening the child sleeps in a room and bed which has been completely disinfected, and it is said that cure is at once produced. As to whether this will be attained in all cases, we do not presume to state.—*Therapeutic Gazette.*

of the previous specimens has arrived at such a tender age, for "Jennie" cannot be much over eighteen months old, and none of them has possessed such a quaint, old-fashioned face, which is the nearest resemblance to a human countenance which we have yet seen in the animal world.

She is very docile and intelligent, likes being petted, cries if she is left alone, and in her playful moments romps about in her cage with the zest of a child. To watch her antics as she climbs about on the bars, or rolls over in play, is quite a fascinating amusement, and the absurd way in which every now and then she sits down and, deliberately folding her arms, proceeds to pinch her weazen little face into grotesque grimaces at her keeper, is irresistibly comical. Our illustration is from a photograph by Major J. Fortune Nott, F.Z.S.

Our illustration of the tiger cub is from a photograph sent by Dr. Henry Buck, of Clapton. The mother of the cub was shot by Mr. Markham, C.S., in the Bignor District, India, Mr. Ribbentrop, the Inspector-General of Forests, Sir Edward C. Buck, and Mr. Reginald Burd being the rest of the party. On the previous day the tigress had killed a large panther, which, it was supposed, the anxious mother was afraid would attack the cubs. A grand fight must have occurred, for the natives who reported it say the roaring was terrific. Sir Edward Buck secured the cub, which is now about five months old, and it was at first fed entirely on milk out of a bottle, as represented in the engraving. The milk diet proved too rich, and a "committee of doc-

human habits. He was taught to sit at table, partake of his meals, use the plate, fork, tumbler, etc. In his actions he sometimes displayed a wonderfully close relationship to humanity.

Mr. Crowley was born in June, 1883, in a remote part of the Congo country. W. H. Smyth, United States Minister to Liberia, bought him just as he was leaving Sierra Leone for home. The little chimpanzee stood the long voyage to Liverpool well, and when he arrived here in a White Star steamer, he was chipper and healthy. The city paid Mr. Smyth the \$125 it had cost to bring Crowley to New York, and Supt. Conklin carried the stranger uptown in the pocket of his overcoat. He was then a little bit of a baby, weighing fifteen pounds or less. Supt. Conklin had a special cage made for him in the monkey house, and made Jake Cook his keeper. Jake named him, and began to train him at once. In a week he had taught him to sit at a table, and within a few months he had initiated him into the use of knife, fork, spoon, dish, and napkin.

Crowley spent his first winter in Mr. Conklin's office, where he ripped up lots of valuable books and had any amount of fun. As he grew bigger, he had to be moved from house to house, in order to accommodate the immense crowds who visited him. Last spring a cage was built for him, at a cost of \$500. In one compartment of it lived Kitty, a chimpanzee, now two years old. Her native village is Banana Point, on the Congo River. She was to have been Crowley's mate, but his death came too soon.