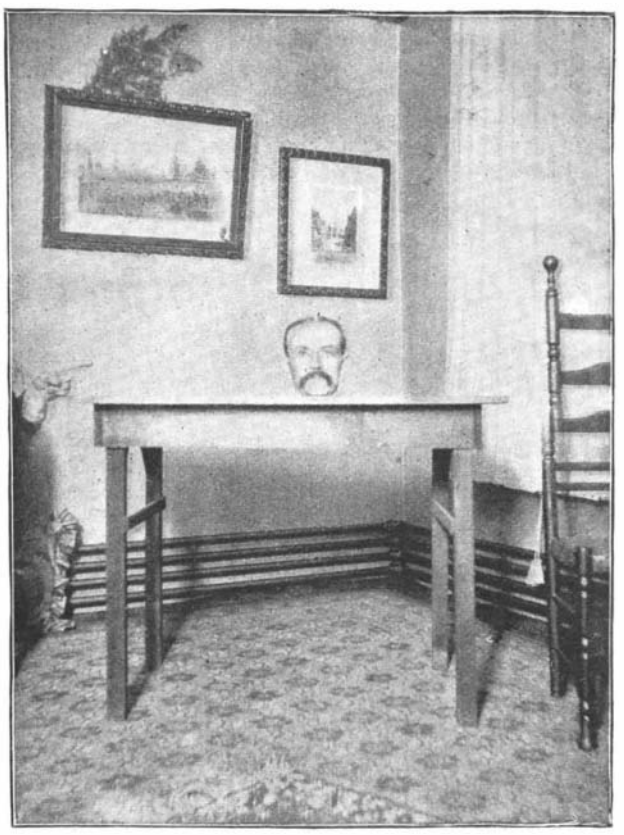
PHOTOGRAPHING A HUMAN HEAD UPON A TABLE.

In the SCIENTIFIC AMERICAN of March 3 Mr. Gilmore showed how, with a box placed on the front of a camera, "duplicate" pictures might be taken. Again, in the SCIENTIFIC AMERICAN of March 24, the same gentleman showed how the head of a living person might be represented as resting upon a platter on a dining room table; the tablecloth hanging down in front of the table so as to conceal the person who is sitting under the table. When I read these two descriptions, I wondered why Mr. Gilmore did not combine his two ideas, viz., of the "duplicate" and "decapitated" pictures -- throw the tablecloth aside and prove by photography that the head on the table is in no way connected with the body under the table, as shown by the accompanying representation.

This picture was made in this way. A table is provided with a top as shown here, having a portion of the top, as A, removable.

The person whose head is to be photographed sits in a chair underneath the table. The board, A, is removed to allow the person's head to pass above the table. The board is again placed in position on the table, and the closer the person's neck fits the hole, B, the better.

A camera is arranged with a box as described in the March 3 number of this paper; but in this (the above) case the camera is turned so that the two doors in the box, C and D, open up and down, instead of sideways. The camera is raised or lowered until the crack between the two doors of the box is on a level with the edge of the table. Now the upper door, C, of the box is opened wide so as to expose to the sensitive plate, when the shutter is worked, the head above the table and all objects in range of the lens above the edge of the table. After the exposure is made with these arrangements, the person whose head has been photographed has nothing more to do with the picture, and he may leave the room. The top door, C, is now closed, and the bottom door, D, is opened wide. By this move you protect the upper part of the plate from a second exposure and leave the way clear to expose the lower and as yet unexposed part of the plate.

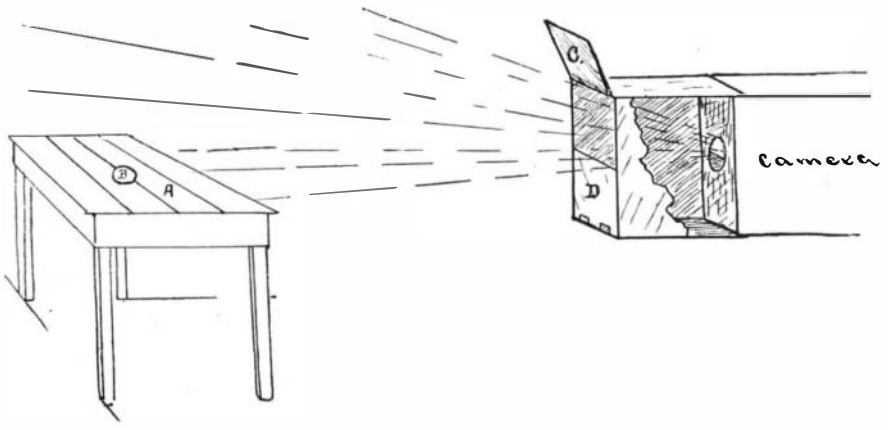


PHOTOGRAPHING A HUMAN HEAD UPON A TABLE.

The shutter is again worked, and this time everything in range of the lens below the edge of the table has been photographed, and, of course, not showing any one under the table. This picture was taken by flash light.

JAMES BURT SMALLEY.

Bay City, Mich.



Electric Railway Dangers.

At a recent meeting at Washington of the National Electric Light Association Mr. J. H. Vail, M. Inst. C. E., of New York City, brought forward a number of interesting cases of electrolysis. Among them were the following:

A plumber in a Pennsylvania city was repairing a water pipe in a house; and, on breaking a joint, an electric arc formed across the ends of the pipe. The house was not in the direct path of the railway circuit. Investigation followed; and it was proved beyond question that there was insufficient electric conductivity of the track system, and also that the earth did not afford a good return, though the tracks were well grounded. It was found that the railway current was traveling along all pipe systems in its effort to complete the circuit to the dynamos in the power station. Actual tests were made with standard instruments. From 135 readings of the ampere meter, it was found that the water pipes leading into the station carried an average current of 93 amperes. Further tests showed that, with 23 cars in operation, 40 per cent of the total current was carried by underground pipes.

Another interesting case was brought to light by a fire in the basement of a house. After it was extinguished, it was found that the current of an electric railway system had been carried along the iron water pipe entering the house. It is believed that, by vibration of the floors, this pipe and a gas pipe were brought repeatedly into contact—each time forming an arc between them. In this way a hole was eaten into the gas pipe and the gas was ignited. After an analysis of the whole matter, Mr. Vail felt justified in recommending the adoption of the complete metallic circuit as the standard for the best railway practice.

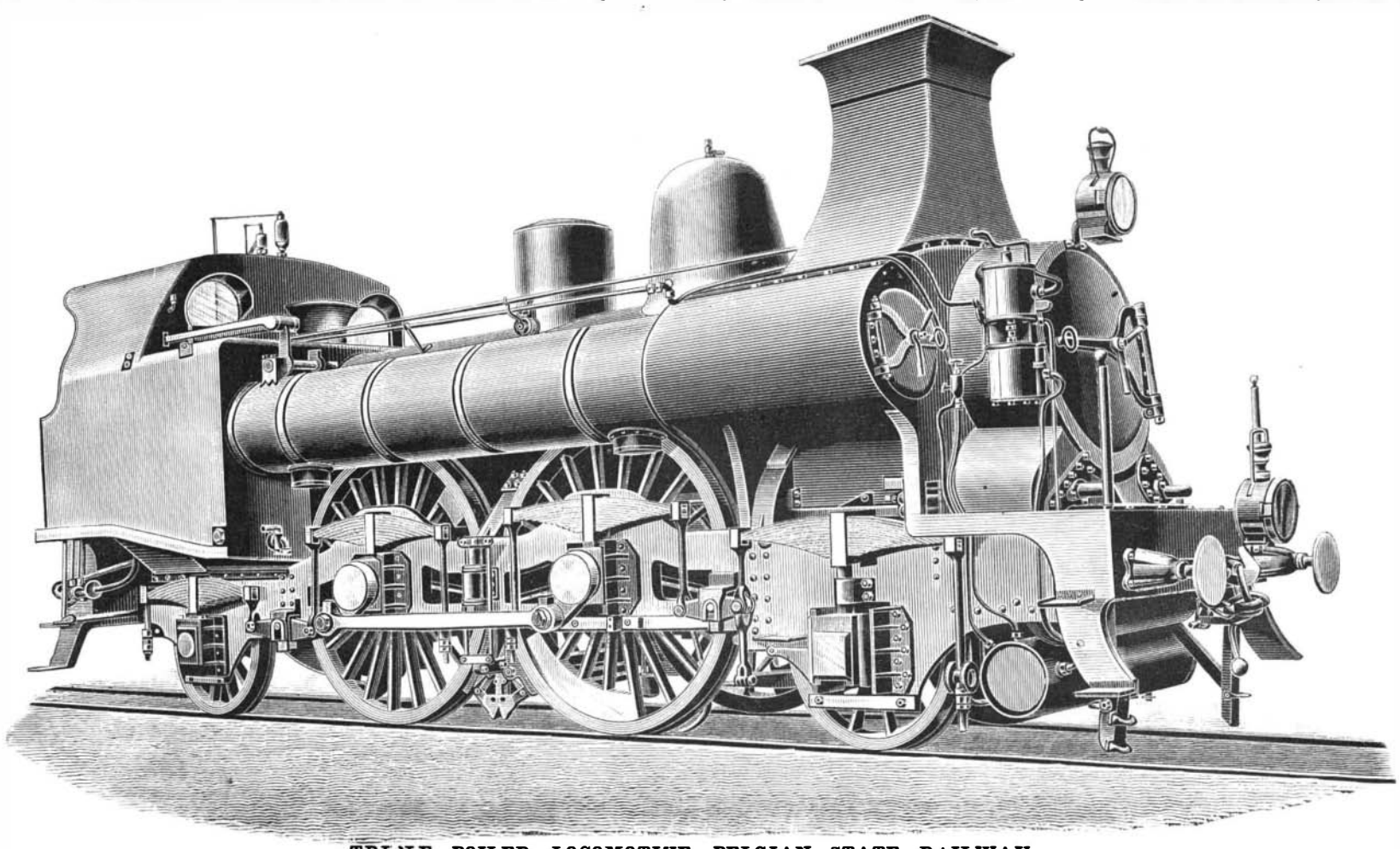
TRIPLE BOILER LOCOMOTIVE, BELGIAN STATE RAILWAY.

The curious-looking locomotive which we illustrate was built in 1888 by the Societe St. Leonard, of Liege, Belgium, and exhibited at the Paris Exhibition of 1889.

In calling for competitive designs of new engines, the authorities required that the competing locomotives should be able to haul a gross load of 150 tons up a gradient of 1 in 200 at 56 miles per hour, without diminution of steam pressure or of the level of the water in the boiler for a distance of three miles at least. The triple boiler engine ran up the grade stated at 61 miles per hour, and took trains of 150 tons gross (that is, including engines) up inclines of 1 in 62 at 40 miles per hour, and, on other occasions, loads of 182 tons up the same gradient at 31 miles per hour. At 59·4 miles per hour, with 150 tons, on a grade of 1 in 200, the power of the triple boiler engine exerted 1,339 horse power.

The engine illustrated has a boiler with three barrels, which have the same fire box tube plate, and the same extension smoke box in common. The chimney is square, spreading out at its base to embrace the side divisions of the smoke box, an arrangement which should improve the draught in the side flues, although it may be doubted if the exhaust steam acts so efficiently in a square chimney as in a round one, and it is certain that it obstructs the view somewhat. The smoke and steam, also, are said to be thrown less clear away from the engine than with the round forms.

The coal consumption is given as 254 to 322 kilogrammes per hour per square meter of grate surface, in other words, it burns an average of 3.167 lb. per hour, which, taking the commercial speed as 44 miles per hour, corresponds to 72 lb. per mile; 1 lb. of coal is said to evaporate 5·6 lb. of water upon the average, or 6·6 lb. as a maximum, results no better than obtained with American locomotives, but the coal burned by these Belgian locomotives is of the poorest "slack."



TRIPLE BOILER LOCOMOTIVE, BELGIAN STATE RAILWAY.

unmixed with briquettes, as commonly practiced in France. As regards economy, the results given by the engine are said to be excellent. There are, it is true, certain details of construction that could be improved, even in the existing engine, as, for example, the square chimney, and the absence of running boards permitting the engine to be got at when under way. There is also, sometimes, an unequal expansion of the tube plate, due to a superior draught in the central series of tubes. A trouble also with engines of abnormally large grate area is the difficulty of obtaining a sufficient draught in the smoke box. The locomotive in question is one of the most unconventional developments of locomotive practice since the time of Stephenson. It was designed with a view of obtaining great steaming power without mounting the boiler dangerously high. Continental and American trains make greater demands on the steam-producing capacity of the boilers than is the case in England; hence these multiple boilers of Flaman, the St. Leonard's Company, and others, have been produced.

The principal dimensions of the engine are as follows:

Fire box, width inside	9 ft. 3 in.
" " outside	9 " 10 "
" length inside	5 " 10 "
" " outside	6 " 3 "
" height, front	3 " 7 "
" " back	2 " 9 "
Grate area	56 sq. ft.
Boiler, central	4 ft. 3 in. diam.
Boilers, side	2 " 3 " "
Tubes, central	180
" side series (48 each)	96
Total	276
Tubes, length	15 ft.
Working pressure	130 lb. per sq. in.
Heating surface, fire box	121·6 sq. ft.
" " boilers	1931·0 "
Total	2052·6 "
Cylinders, diameter	19·6 in.
Stroke	23·5 "
Drivers	6 ft. 10½ in. diam.
Weight, engine	56·8 tons.
" tender	29·5 "
Total	86·3 "

We are indebted to *Engineering* for our illustration and the foregoing particulars.

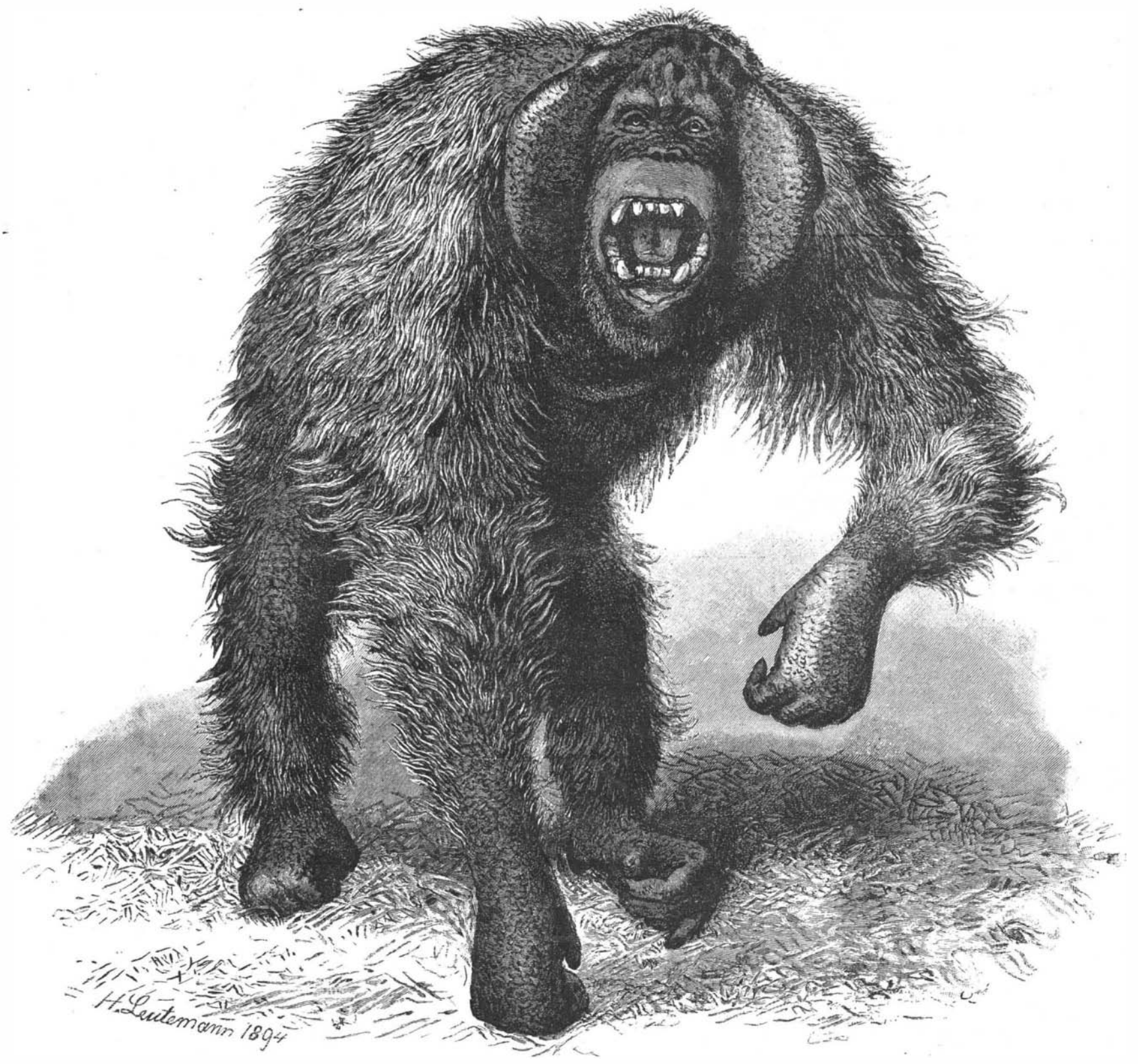
THE ORANG-OUTANG IN THE LEIPSIC ZOOLOGICAL GARDEN.

We publish to-day an engraving (for which we are indebted to the *Illustrirte Zeitung*) of the gigantic orang-outang in the Zoological Garden at Leipsic. This and two others that died last winter from the effects of the severe weather are the only full-grown orang-outangs that have ever reached Europe alive.

Any one who has formed his idea of a full grown ape of this kind from small or partly grown ones will be surprised when he sees our engraving, for it would be impossible to imagine such a remarkably shaped head with little ears that are entirely covered, such a hideous face with the cheek and throat pouches.

This animal is not as tall as one would suppose from a first glance, for he measures, when standing upright, only a little over 4 feet, but with his long arms stretched upward he measures to the tips of his fingers 6 feet 8 inches. When in this position the disproportions of his body are very noticeable, the thickness of his head, the breadth of the shapeless face, the wonderful development of the powerful chest and the broad back, the thick bull-like neck, but especially the length and strength of the arms compared with the shortness and weakness of the calfless legs. The large and strong, although slender, hands are covered with wrinkled skin that gives him the appearance of wearing kid gloves that are much too large for him. His feet or his hind hands are much longer than his fore hands, and he always keeps his toes turned under, so that he does not stand on the soles of his feet, but on the outer edges. It is impossible for an orang-outang to stand upright or to turn about without supporting himself by means of his arms, nor does he ever walk with a stick, as he is often represented. The number and arrangement of his teeth are the same as those of men, but his teeth are all stronger, and his eye teeth project like those of a beast of prey. The orang-outang shown in the illustration has lost one of his upper eye teeth, and his other teeth are much worn. Many scars on his hands and feet show that he has led an eventful life and received honorable wounds. His left thumb is bent and one of his toes is crippled.

Although possessed of such physical strength and so belligerent, the orang-outang is a vegetarian, living on fruits, buds, and young sprouts, but varying his diet by robbing birds' nests and hunting insects. In captivity he eats soaked rice, milk, raw eggs, oranges, dates, and he is very fond of bananas and white bread.



THE NEW ORANG-OUTANG IN THE ZOOLOGICAL GARDEN, LEIPSIC.

British Report on the World's Fair.

The British Royal Commission to the World's Fair at Chicago has just issued its report. It is very long and complete, comprising 61 large pages, with 45 sections and appendices, and its tone is decidedly favorable to the Exhibition. It gives an excellent description of the exhibits, and concludes by saying:

"It is impossible for those who did not visit the exhibition to understand the enthusiasm which pervaded it and the genuineness of its character. It would be an easy matter to criticise its shortcomings, but it is undeniable that it was a courageous inception, splendid in execution and successful in its results."

The report also says that Europe did not appreciate the proper value of the Exhibition, European interest seeming to fall back after the opening of the Fair.