



The World's Columbian Exposition is now an "open fair" to a sufficient extent to satisfy the most radical. The gates are open for visitors at eight o'clock every morning and do not close until eleven o'clock at night, seven days in the week.

Near the Sixty-fourth Street entrance to the Exposition grounds are the exhibits of the Pennsylvania and of the New York Central and Hudson River Railroad companies. The New York Central exhibit is on the left. The building erected by the railroad company, and which forms a part of this exhibit, is much like a triumphal arch in architecture.

Two tracks of considerable length extend along one side of the building, and here are exhibited the latest models of car and engine building. One train consists of the famous engine 999, which holds the record for speed at the rate of 112 miles an hour. Attached to this engine is a train of three cars, comprising two day coaches and baggage and buffet car of the latest type, such as are used on the Empire State Express. On a short track on the side of this train, near the engine, is the famous old engine DeWitt Clinton, with the three passenger coaches attached. These two trains stand in the same relative position as illustrated in the SCIENTIFIC AMERICAN of May 13. On the track, at the left of the Empire State Express, is a train of five Wagner cars, fitted in the most magnificent manner. This train comprises the baggage and smoking car Columbus, the parlor car Pinzon, the compartment car San Salvador, the sleeper Isabella, and the dining car Ferdinand. In the car Columbus is a barber shop, bath room, library, etc. The Pinzon is finished mostly in white and gold, with the richest of silk draperies. The San Salvador has accommodations for sixteen people in the compartments, all of which are furnished in different colors. One compartment, called the bridal compartment, is most beautifully furnished. The Isabella is finished mostly in white mahogany, while the upholstery is in brocaded plush. This car, like the others and like the dining car Ferdinand, has the richest of silk draperies and every possible convenience. The entire train is lighted by electricity.

The exhibit of the Pennsylvania Railroad is contained in a building designed to represent a model passenger station of classic architecture. It contains a main hall 100 feet long and 40 feet wide, in which is displayed a collection of models, reliefs, maps, and illustrations covering a vast field of railroad topics and making in themselves a most valuable and instructive exhibit. There are many models of engines and cars used in the early days of railroading, and also models of stage coaches and wagons used before the railroad era; also models of canal boats and other early means of transportation. Among the models is one of the first trains run on the Camden and Amboy and the Philadelphia and Columbia Railroads. Among the models of cars is one of the old passenger car Victory, and of an emigrant car made over into an ambulance car to use in the hospital service during the war. The photographs and other illustrations cover an infinite variety of subjects connected with railroading. Among them are pictures of wrecks, of scenes at the time of the Johnstown flood and afterward, etc. Ferry transportation is illustrated by models of early types of ferry boats and of this company's latest and finest boat, the Washington. Methods of transferring freight cars across waterways are also illustrated.

Another set of models illustrates the advancement of modern block signal systems. Among the reliefs are two representing four centuries of progress in transportation, one dated 1492-1792, the other 1792-1892. Turning to the financial part of railroading, there is an exhibit that shows in a peculiar way the amount of money represented by this road. Silver dollars are laid on the top of sections of two rails, the dollars touching each other, and a placard explains that it would require as many silver dollars as could be laid on both tracks of 7,980 miles of road to equal the amount of money invested in this railroad. There are also four tracks on which is the outdoor exhibit. These tracks represent the standard adopted by this railroad. They are laid with steel rails weighing 100 lb. to the yard, with the latest type of frogs, switches, stone ballast, signals, etc.

All switching is done by the standard pneumatic interlocking switches and signals. On one track is shown the original locomotive John Bull put into service in 1831. This is believed to be the oldest locomotive in America. The two cars to which this loco-

motive is attached are passenger cars that were used on the Camden and Amboy road in 1836. The two cars which transported the large Krupp guns are also shown, each car with a model of a gun in place. One car with its load weighed 460,000 lb., the other 253,300 lb.

The Smithsonian Institution makes an exhibit in the Department of Ethnology in the Government building that gives an excellent idea of the physical peculiarities and modes of dress of the native peoples of this country and of Alaska. In a series of glass cases there are shown life-size models of these natives, each dressed in the manner peculiar to the tribe he represents.

It is a fact seldom appreciated that an Indian woman in carrying a child has the child strapped to her back looking in the opposite direction, while with the Esquimaux woman the child is so placed that it can readily look over the woman's shoulder. Rows of other cases contain large displays of the handiwork of these natives.

In the gallery is the Alaskan exhibit, where are shown samples of minerals, wares, and household utensils manufactured by the natives. Samples of grain are a revelation as to the richness of the soil in parts of this far-away corner of the United States. The most attractive features of the exhibit are the distinctively Alaskan wares, which reveal an unexpected skill among these people. Their carving in ivory, horn and wood is shown by many samples, and there are many pieces of metal work which show much ingenuity.

An attractive feature of the exhibit in the Leather and Shoe Trades building is a collection of footwear from all parts of the world, representing every conceivable type, some of them going back as far as the middle ages. Among the exhibits are specimens from China, Uruguay, Siberia, the Philippine Islands, Finland, the Caucasus, Australia, Sweden, Russia, Asia, Africa, South America, Mexico, Palestine, Jerusalem, Norway, Curacao, Japan and other countries.

Leather of nearly every conceivable kind and of all colors is shown in abundance. Among the more noticeable hides shown are a horse hide with the mane and tail intact, walrus hides which are from an inch and a half to two inches thick and an African elephant hide which weighs 800 pounds.

It is a misfortune there are exhibits in any of the galleries of the Exposition buildings. So much walking is necessary in order to inspect the various buildings that visitors hesitate about climbing stairs, and seem to be more willing to risk losing a chance to see attractive exhibits than to climb the stairs. It is late now to install passenger elevators to supplement the stair service, and it only remains to advise people to by all means see what the gallery in each building contains. Some of the rarest and most remarkable exhibits are located in the various galleries.

Informal gatherings are held in the rooms of the Associated Engineering Societies, No. 10 Van Buren Street, every Monday evening from 8 to 10 P. M. Visiting engineers and their friends are cordially invited.

#### HOW TO SEE THE EXPOSITION IN A WEEK.

The great majority of people who will visit the World's Columbian Exposition at Chicago will probably not have over a week at their disposal for sight-seeing. With so little time as this it is an embarrassing question to decide how to best utilize it. There are probably one hundred buildings in the Exposition grounds and in the Midway Plaisance that every person attending the Exposition would find greater or less enjoyment in visiting. Besides this, there is a great deal of interest in studying the grounds, especially the landscape gardening. Besides these two things, which can easily absorb hours and days of time, there is another matter that should be borne in mind at all times, and that is the immensity of everything. Every visitor at the Exposition must consider these things, so as to save strength as well as time. A knowledge of the general plan of the grounds is necessary to accomplish this. Thus, suppose a man from Iowa should reach the Exposition grounds in the morning, determined to go to his State building and register and to then visit the Dairy. After registering, he asks the guard where the Dairy building is, and is told that it is in the southeastern corner of the grounds. If he take the most direct route in an effort to walk to this building, he would have to walk nearly three miles, whereas, were he to take the Intramural road, he could go almost from the door of one building to the door of the other in twenty minutes, at an expense of ten cents, thus saving a great deal of time and strength, both of which are important considerations.

It would be quite impossible to lay down a general rule for all people to follow in planning how to best utilize their week of time. Some people would wish to see everything; others would be content to see only certain specific exhibits. A mistake most liable to be made is for people to enter the first building they see after finding themselves in the grounds and to become so interested in this building that before they realize

the situation the day has come and gone and they have seen only a part of one building.

No person visiting the Exposition can regret first of all taking a general view of the grounds. The Intramural road skirts the grounds in such a manner that a good idea can be obtained of the location of the buildings and the arrangement of the walks and promenades. The electric launches on the waterways approach all the buildings, and the round trip on one of these boats is not only a delightful trip, but it also adds greatly to one's understanding of the location of the buildings. Having made the trip on the elevated road, which is raised from twelve to twenty feet above the ground, so that the view is thus much more enhanced, and also having perhaps made the round trip on an electric launch, the visitor is ready for the work of studying the exhibits.

The safest place to begin is in one of the largest buildings, such, for instance, as the Manufactures and Liberal Arts building, which consumes at least a day. It would take another day to see what there is in the Electricity building, the Mining building, the Palace of Mechanic Arts and the Transportation building. The third day would be consumed in looking over the Agricultural building, the United States Government building, the Fisheries and other buildings. No one should fail to devote at least one day to the Gallery of Fine Arts. The remaining two days would cover a glance at some of the State buildings and foreign government buildings, to the concessions in Midway Plaisance and to a second look at exhibits which excited the most interest.

It would be a delightful study to take up as a subject the splendid exhibit made by Germany, and follow it from building to building until everything German had been seen. The same line of study would be particularly interesting in the Japanese exhibit, as also the French, English, and exhibits of other nations. But to attempt to divide the work in this way would result in the loss of at least half a day in going from one building to another.

In the gallery of the Fine Arts building Japan makes more of an exhibit than it does on the main floor. A visitor who neglects to see this Japanese art work in the gallery loses much, because the whole art exhibit of Japan is a revelation. It shows that these people possess artistic feeling, the existence of which the outside world has never fully appreciated.

The mechanically inclined visitor will find a feast for his eyes in the Transportation building, and more especially in the annex to this building, where there is a grand display of locomotives, American and foreign, old style and new style. In the gallery of this building are many smaller exhibits in the line of transportation and a particularly fine display of bicycles.

In the Mining building gallery are many displays of minerals equally as interesting as many of the displays on the ground floor. In the Electricity building there is more in the gallery than the average person will be interested in than there is on the ground floor, because exhibits in the gallery comprise mostly electrical devices rather than methods of generating electricity, to which the ground floor is mostly given up.

The gallery in the Manufactures and Liberal Arts building is given over almost wholly to liberal arts, and here one finds extensive exhibits which concern the education of the young. The ground floor of this building is given over to the department of manufactures, and here is exhibited in perfection the choicest of manufactures of all the leading nations of the world. A person cannot visit one of these exhibits without feeling in touch with the people and the nation making it and becoming interested in them. Japan makes a remarkably fine display of ornamental and artistic wares. Germany, Austria, France, Russia, Denmark, Norway, Switzerland, Italy, Spain, and, in fact, all corners of the world make exhibits of manufactures and wares each peculiar to themselves. The section occupied by Great Britain contains not only the exhibits from the British kingdom, but also a large and fine exhibit from Canada, and many choice exhibits from Australia and other British colonies.

In the Agricultural building nearly every foreign nation makes an exhibit more or less pretentious. In the Palace of Mechanic Arts visitors are instinctively drawn toward the great power plant, where are engines aggregating twenty-five thousand horse power, many of the engines being in operation all the time. It is here that energy is generated to supply the electric lighting of the Exposition and to furnish in addition 5,000 or more horse power of electrical energy for power purposes. Then there is the Leather and Shoe Trade exhibit, the Forestry exhibit, the Dairy exhibit and many others not quite so large, but each interesting and instructive.

In connection with such a week's visit comes the question of expense. Seven days' admission to the grounds, at 50 cts. an admission, would amount to \$3.50. An excellent lunch can be obtained at any one of dozens of restaurants in the grounds for a like sum or for less. It is a popular thing for people to carry lunch with them, and every day at noon thousands of people

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## Exposition Notes.

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can be seen scattered about the grounds and buildings resting and eating lunch. In order to accommodate lunch parties, the Exposition has provided every convenience for their comfort in the building under the charge of the Bureau of Public Comfort. In addition to the foregoing expenses, there is the cost of an occasional trip on the Intramural road, and there should be a few rides on the electric launches and also on the steam launches out into the lake, so as to secure a good view of the Exposition grounds from the water front. The expense of these trips should not exceed \$2. Then there are concessions of various sorts, some of which each visitor will want to indulge in according to his taste, the size of his purse and the amount of time at his disposal. But the entire cost of these to the visitor of a week should not exceed \$5. All these estimates are based on actual experience, and to a person who is at all judicious they should be outside figures, so that the expense in itself for the seven days would cost \$14. Going back and forth from the boarding place to the Exposition would not cost over \$2 at the most for the ordinary means of transportation. The round trip by boat is 25 cts., and this is a trip that should be taken because of the opportunity it affords of seeing the beauty of the Exposition grounds from the lake. The Illinois Central Railroad has a most excellent and efficient service, for which it charges only 10 cts. a trip, while the cable and elevated roads carry passengers to the grounds for a 5 ct. fare.

If one will come into the grounds from the lake through that marvelous entrance which seems to revive to a college graduate what he imagined the entrance to some of the ancient cities might have been, and sail into the lagoon on a gondola, he will get some impression of the vastness, the architectural beauty, and completeness of this preparation, which it is impossible to describe. Superlatives are unequal to the occasion. Then you must add to that the thirty buildings of the various States of the Union, which, in size and appointment, surpass the buildings of the different nations at the Paris Exposition. The illumination itself was worth a visit from New York.

This Exposition will be of value to every visitor, according to the degree of intellectual or other cultivation he brings with him, to avail himself of the infinite number and variety of the objects presented to his gaze. The whole time that the display will be open, it will soon be discovered, cannot but be altogether insufficient to make anything like a minute inspection of the departments. Take, for example, the Art Palace. In that gorgeous structure there are not less than 8,073 exhibits, one-half of which consist of pictures in oil and the other half of statuary, water colors, pastels, engravings, etchings, and pen and ink, charcoal, black and white, and other drawings—all of exceptional value. Surely one minute cannot be thought too long a time to devote to the study of each example. Yet such a brief time would amount to one hundred and thirty-five hours, or twenty-two and one-half days of six hours each.

The Japanese building, Hooden, as it is called, has been carefully reproduced at the Fair. It represents the architecture of three different epochs. The central portion belongs to the seventeenth century, the south wing to the fifteenth century, and the north wing to the eleventh century. The main structure has a double roof, sloping in graceful curves on four sides from a gabled over-roof. Two striking features of the exterior decoration are weathercocks representing the bird hoo. They are cast in a metal called kodo, an alloy of gold and copper. In the principal portion are three large images of Buddha, carved in wood by the famous sculptor Jo Cho. Rich traceries of wondrous color adorn the ceiling, and their effect is intensified by the skillful introduction of precious stones. Walls and doors are overlaid with gold leaf. Panels containing either scenes from the paradise of Buddha or texts from the sacred books are disposed alternately as a decorative scheme. Western art may imitate but hardly equal this decorative work. The original edifice—the seat of the great house of Tokugawa for nearly three hundred years—has had a most remarkable history. Although many destructive wars have occurred since its erection, yet the exquisite decorations remain substantially intact.

A few days ago there was excitement near "Blarney Castle." A box had arrived there, and soon there came a custom house officer with an invoice which called for "one Blarney stone." When the box was opened it was found to contain a fragment, weighing forty pounds, of the celebrated Blarney stone itself. That portion had been severed for many years, and was now loaned by the Irish authorities to Lady Aberdeen. It must be returned when the Fair is over. According to the legend, Cormack Macarthy held the castle of Blarney in 1602, and concluded an armistice with Carew, the lord president, on condition of surrendering the fort to the English garrison. Day after day his lordship looked for the fulfillment of the terms, but received nothing but protocols and soft speeches, till he became the laughing-stock of Elizabeth's ministers

and the dupe of the lord of Blarney. Another legend has it that the stone is really a fairy, whose lover had been slain in battle. Before having changed herself into stone, she obtained from the spiritual powers the wish that whoever kissed the stone might receive the ability to become a great talker. The fragment has been placed in position on the model Blarney Castle, but not quite in such a dangerous situation as in the original.

Among the many articles of rare and curious make is a very delicate handkerchief among Queen Margherita's laces. It is valued at \$30,000. Three different artists have wrought upon it during a period of not less than twenty years. It is so light that one is not conscious of it touching the hand if the eyes be shut, and it can be easily folded into a gold casket not larger than a Boston bean.

It is said that a Scotsman who employs 4,000 French women near Paris making lace has sent a pair of curtains for a bay window. In the six months required for the making of these curtains two thousand different women worked on them. They are only three yards long; but the cost was \$6,000. This Scotsman has a \$50,000 exhibit of laces, and he came himself to superintend their effective hanging.

Among the mineral curiosities there is a twelve ton lump of cannel coal sent from Lancashire, England, by the Wigan Junction Colliery. Pennsylvania has put up a pyramid of anthracite, ten feet square at the base and fifty-two feet high. It contains just one hundred tons. From George's Creek, Allegheny County, Md., comes a lump of cannel coal 15 feet long, 4 feet wide, and 3 feet thick. The Roslyn lump from the State of Washington is the largest ever mined. It is 5 feet thick, 26 feet long, and weighs more than 50,000 pounds.

Mr. Gladstone has sent one of his axes for exhibition in the Forestry building. It is of fine steel, and is very sharp and heavy. As is very evident from the worn condition of the ash handle, the tool had done considerable service. So far as is known, this is the only instance of an ax having been permitted to pass out of the possession of the veteran British premier, and the principal members of the timber trade of the country appreciate highly the exceptional honor thus displayed to them and their craft.

## A CORNER OF THE PALACE OF MINES AND MINING.

At the left of the western entrance to this building is the Japanese exhibit—Japan's demonstration to the world that western scientific methods have been adopted. Specimens of her riches are shown—gneiss, sandstone, clay, lava, granite, all beautifully arranged in series of graduated test tubes to show a mechanical analysis. At one end of the series the "mother rock" in a mass, at the other a tube containing the soil, the intervening tubes, from six to twelve or so in number, showing the degrees of disintegration. This is the work of the Imperial Geological Survey. So are the remarkably beautiful colored geological maps on the walls. They show the strata, mineral deposits, etc., of the islands. The attendant told me that they were executed at the Tokio University. Beside them hang series of photographs of the mining processes. They, too, are clear and most carefully made. Ingots of copper and antimony are displayed. The specimens of stibnite are not finer than those in the Natural History Museum in New York, but they are so numerous that one realizes that the magnificent crystals are not rare in Japan. Iron ores are represented, chiefly by hematite, marcasite, and pyrite. Anthracite and cannel coal are shown in small masses. Graphite crucibles range from one of the capacity of a pint to those of very large size, of fully twice the capacity of those used at the Brooklyn Chrome Steel Works in the manufacture of steel. Table salt is displayed in bags and glass jars. In the latter some of it is in ornamented disks, as if run in a mould.

Beautiful specimens of native sulphur are in the cases, and on the floor are two masses of "roll brimstone," not less than four feet in length. Among the minerals shown the specimens of rhodonite, beryl, and amethyst are notable. One case is filled with white topazes. The display, so far as I have spoken of it, might have been arranged anywhere in our own country. The object which is characteristic and national is a miniature mountain. Near the summit is a tiny temple, steps cut to it from the foot, and little flags placed at intervals on the way up.

This is all the casual visitor sees, but to one who has made the acquaintance of the gentlemanly Japanese in attendance, the mountain is opened. Within are four galleries showing every step of the process of mining copper. It is alive with Lilliputian figures in every possible position. The ore is lowered in buckets, arranged on pulleys run by windlasses. The smelting pots are in the lowest gallery, and a tiny figure holds a book the size of my little finger nail, in which he makes his record of the assay. It is but a step from the Japanese exhibit into that of the Canadian provinces. It is evident they have felt that this is a valuable opportunity to show their neighbors their mineral resources. British Columbia announces

in a conspicuous place: "Total yield of gold from placer fields from 1858 to 1893, \$53,512,652. The quartz veins from which this has been derived have not yet been worked. They offer fine field for investigation."

The quartz is here in large masses, yellow enough to be suggestive. An immense pyramid of blocks in imitation of gold bullion is close at hand. "Am I to understand that this is real gold?" said an earnest-faced woman to the attendant.

"No, madam, we could not afford to have so much gold out of use," was the reply of the man with inflexible features.

"I told her I was sure it couldn't be, but she knew it was; so I just thought I'd ask."

Very likely the attendant has been asked the same question so often that it has ceased to be amusing to him.

Asbestos in large quantities is shown from both Quebec and Ontario.

The Johns Asbestos Manufacturing Company has some of its machinery only a few feet away, where one can see the crude material changed into cloth and also see the various grades of paper made of it. The company has had great demand for this for use in the Fair buildings, and in the temporary lodging houses, where it forms walls and ceiling.

Ontario shows a fine display of mica sheets easily two and a half feet in diameter. Sperrylite is a newly discovered arsenide of platinum. It is a yellow dust-like powder found in pockets and assays fifteen ounces to a ton of platinum. Small quantities of gold, osmium and iridium are also found in it. The name of the ore is derived from its discoverer, a Mr. Sperry. Near by is a quantity of black, slaty ore which also contains a small per cent of platinum, supposed to be in paying quantities, but not yet developed.

Nickel derived from pyrrhotite and chalcopyrite is shown in every stage of its reduction from the ore, and large photographs of the processes are to be seen.

Apatite is shown in every state—magnificent crystals, too fine for any place but a cabinet, and the amorphous masses fit to be ground for a fertilizer. Quantities of steatite and graphite are here, and very rich serpentine. The beautiful serpentine vase was made at the Canadian Granite Works, at Ottawa.

The New Rockland Slate Company, of Montreal, would have us believe that no well appointed city house can afford to be without their slate wash tubs, made so that the front of the tub forms the wash board.

Nova Scotia shows a variety of building stones, quantities of red and brown hematite, and a tempting display of gold-bearing quartz.

New Brunswick has sent red granite, in column and monument. Gypsum forms a part of the exhibit from this province in its native condition and reduced to plaster of Paris.

Next to the Canadian section is the Australian. In this, one feels that gold is not only widely distributed, but must be very abundant. It is shown in nuggets, strings, grains, octahedra, and embedded in the quartz. But most interesting are the specimens of good sized, irregular masses, separated from the quartz by the action of hydrofluoric acid. Why does this not suggest the opening of a great industry in Greenland in cryolite? Australia shows immense circular piles of ingots of copper and tin, the latter trimmed with ribbons and rosettes of tin.

In the South African section blue asbestos is to be seen, about the color of lazulite. The principal attractions in this exhibit are, first, the machinery (which is in operation from two to four in the afternoon) for crushing the diamond-bearing rock, washing the fine particles, and separating the gems; and second, the sturdy Africans who operate it. They look as if they had just come from a kraal. Nowhere have I seen the crowd so dense and eager as about this exhibit.

## An Ericsson Medal.

A medal commemorating the life and services of the late Capt. John Ericsson has been presented by the Swedish government to Col. W. C. Church, editor and proprietor of *The Army and Navy Journal*, New York, with whom was left Ericsson's private and business papers, and who has written a biography of the great inventor. The medal is of silver, and beautifully executed, there being on the obverse a medallion head of Ericsson and on the reverse a monitor under steam, with Latin inscriptions describing Ericsson as "skilled in the mechanic arts and wise in war."

INVENTION is sometimes thought to have reached its limit, but of the energy in a pound of coal when burned, some one has calculated that only 1 per cent is used in moving a passenger and only one-half of 1 per cent in incandescent electric lighting. The rest goes in friction and waste. The problem of the next century is going to be the saving of this wasted 99 or 99½ per cent, just as the problem of the last century has been to secure the use of 1 per cent which moves trains and the ½ per cent which makes an electric light.



**Metal Ties in Mexico.**

According to Engineer John Birkinbine, the Mexican Railroad has now some 150 miles of track, including the Pachuca branch, laid with steel ties which weigh 124 pounds each, or 126 pounds with the two key bolts. These ties are 8 feet 3 inches long, rolled so as to have a longitudinal web, and have clips for holding the rails formed by cutting slots out near either end of the sleeper and bending up the steel. The first metal ties of crude design were placed on this road fourteen years ago. On the Inter-Oceanic Railroad, some 50 miles had been laid with "pot" sleepers, an English monstrosity, consisting of two cast iron dishes oval in form, which were inverted in the ballast and connected together by wrought iron bars, the rails being keyed to the pots. About one-fourth of these have been replaced by steel sleepers, and further replacement is made as rapidly as finances permit. The steel sleepers now used are 6 feet long, weigh 90 pounds each, and have near the ends square bolt holes, but no clips. These nest nicely for shipping, and cost \$1 gold per sleeper, delivered at Vera Cruz. Wooden ties, 8 feet x 6 inches x 6 inches, cost in the vicinity of Pueblo and Mexico 63 cents for pine and 95 cents for oak; therefore, at the present exchange, the pine ties cost in gold 42 cents and the oak ties 64 cents each. As railroad supplies pay no duty, the expense for steel ties is, therefore, not greatly in excess of wood. On the Southern Railroad (3 foot gauge), steel ties 8 feet long, weighing 110 pounds, are used.

**THE WART HOG, OR VLACKE VARK.**

This is a new arrival at the Zoological Gardens. The wart hog, or vlacke vark, or Ethiopian wart hog (*P. Ethiopianus*), is a native of Southern Africa. This species differs from his brother from North Africa (*Ætians* wart hog), inasmuch that his warts at the side of his face are larger; in fact, he is a more formidable animal, his tusks, when full-grown, reaching eight inches in length. The animal lives entirely on roots. The color of this hog is gray, with dark mane, and hair sparsely scattered over the body. When chased, Gordon Cumming says, he presents a most ludicrous appearance on account of his short neck, being unable to look round, and naturally anxious to see if his pursuers are gaining upon him, he is obliged to lift his snout well in the air, so as to look over his shoulder, and with that, and his tail, when running, stiff and upright, he has a most absurd look. The above sportsman also says the animal is not devoid of sagacity.—*Black and White.*



THE WART HOG.

**Do Doctors Spread Contagion?**

The surgeon and the obstetrician utilize the means that experiment and observation have proved necessary to render their work aseptic. In case of the entrance of disease germs, they take prompt means to destroy them, or to neutralize their effects. It behooves us, who practice among children suffering from contagious diseases, to inquire if we are equally careful.

The surgeon about to open an abdominal cavity removes all possible sources of infection from his patient's person and environment, and goes to his work with clean linen and clean hands. Do we do likewise?

Some time ago a prominent operator sent me an invitation to witness an abdominal section, adding in his note, "Provided you have not visited a case of scarlet fever or other contagious disease during the last twenty-four hours." I could not but think, if such precaution is necessary to insure the safety of this patient, what are the risks to the little children that I shall visit after seeing the case of scarlet fever or other contagious disease, and whose systems are fertile soils for the poison to develop it?

The danger of such conveyance is great, as physicians with large family practice know, and many, like myself, have been taught the lesson by sad experience. I can recall several instances in which the children of physicians have fallen victims to scarlet fever and diphtheria, the cause being clearly traced to disease brought home by their fathers.

Let me illustrate this danger by a description of a physician's visit to a case of diphtheria. The doctor enters the house, removes his hat, overcoat and gloves, and is shown into the room containing the patient, and comes into direct contact with the atmosphere loaded with the germs of the disease. His hair, woolen clothing, hands, etc., must more or less absorb the poison, in his stay of about fifteen minutes. What does he then do? He replaces his overcoat, carefully buttoning it up, as if to keep as many of the germs as possible warm and well protected. He puts on his hat as he crosses the threshold, jumps into his carriage, covers himself with robes, and drives to his next patient; enters, takes off his hat and coat, and wo to any little ones who live in that house! The doctor

has probably that with him which will more likely kill than cure.

What should be done to diminish this danger? Stay no longer in a house containing a contagious disease than is absolutely necessary. Don't remove your hat or unbutton your coat in that house. After examining the patient go down stairs, preferably at an open door or window, and give directions for treatment. The family of the patient will respect you for the care you exercise when you explain the reason. Drive without covering with robes to your next patient, and be sure that patient is not a child. Never allow a messenger from a case of contagious disease to call or wait for you in your office. Instruct him to bring written messages and leave them at your door. If the messenger wishes to speak to you, tell him to wait outside your office and ask the servant to call you to the door.

I have more than once been startled on entering my office to see a man or woman whom I knew had been constantly for days and nights nursing a bad case of diphtheria, sitting complacently alongside of two or three children, all waiting to see me. On several occasions mothers have brought children, suffering from severe attacks of diphtheria, to my office and waited to see me.

When you come home from a case of contagious disease, besides washing your hands, face and head with soap and water, hang up your hat and coat in the air, and put on a fresh coat.

I did this some time ago and forgot to bring them in when I went to bed. It rained hard all night—but better lose a hat and coat than a patient.

If you return late at night from a case of contagious disease, besides washing, undress before going into the room where your children are. Keep your own

children out of your office, and do not take them in the carriage, with you when visiting patients. How do you know but some of your calls may be upon those with contagious diseases?

Our board of health instructs us, in cases of contagious diseases, to forbid the children of the household to attend school or other places of public resort. This is a wise precaution, and the doctor, when he has been in contact with contagious disease, should, so far as possible, follow the advice given to the children.

We are told that familiarity with crime leads us to endure it. Likewise familiarity with contagious disease is likely to make us at times careless in using the means necessary to prevent its spread. Physicians are but mortals, and while as a body they are conscientious in the discharge of their duties, candor compels me to confess that they are not at all times as careful as they should be.—*Dr. John Graham, in Phila. Medical News.*

**The Purification of Water.**

The drought happily appears to be coming to an end, but the welcome showers of rain must be continued for some time if our stock of water is to be adequately replenished. In the meantime, the water supplied for domestic use must necessarily have become less and less pure and the impurities which pollute the streams less attenuated. The increased proportion of suspended and dissolved impurities which are presented to the sand filters must greatly impede the filtering process, and if this process is hastened—and we cannot doubt but that the temptation must occur to do this—inadequate treatment results and water unfit for drinking purposes may be distributed in the mains. A continued season of dry weather is especially a time at which very careful regard to the treatment of water for drinking purposes should be given.

The purification of water supplied to the consumer's house, be it from the pump or the main, may be effected thoroughly and efficiently if he will only exer-

cise ordinary care and judgment in regard to the use of filters or to other treatment of the water. Water may be made fit for drinking by three processes: 1, treatment by precipitation; 2, by filtration; and 3, by boiling. In some cases it is advisable to combine the effects of two or more courses of treatment. The latter process (boiling), though of course efficient, is not popular, because the water is rendered tasteless and insipid by withdrawal of the gases, chiefly oxygen and nitrogen, and part of the mineral salts in solution. Treatment by filtration is largely in vogue because it is simple and convenient. It is well known, and it is to be feared that it occurs in many instances, that filtration may render the water much less pure. A word therefore with regard to the choice and management of filters. The best and most effective filtering materials are those which not only remove organisms, matters in suspension, or even soluble matters, but which exert an oxidizing action upon the organic contents of the water and an aerating action upon the water itself. Such agents are well burnt animal charcoal, spongy iron, magnetic iron, polarite and coke. For the mere removal of organisms, filtration through kieselguhr and biscuit porcelain is effectual.

Animal charcoal has grown into disrepute owing to the observation that the organic constituents of water in long contact with it decompose more rapidly than they otherwise would do, a fact which is probably accounted for by the presence in the charcoal of calcium phosphate, a material which favors the growth and development of low forms of life. If properly cleansed and frequently renewed, however, animal charcoal exerts a marked purifying as well as aerating effect upon impure water. Whatever medium is used, every part of the filter should be easily got at for the purpose of cleansing or for the renewal of the filtering material.

We have repeatedly drawn attention to the investigations of Dr. Percy Frankland upon the action of filtering agents, whose experiments showed that well carbonized coke was one of the best filtering materials that could be used. It is cheap, can be easily renewed, and effects the removal of organisms better than any other material experimented with. A drawback to its use is the long preliminary washing it requires before the water becomes clear, owing to the presence in its multiple pores of tarry matters derived in the distillation of the coal. When foul it is still available of course for use as fuel. A common barrel of eighteen gallons capacity provided with a false bottom and filled with layers of respectively fine, medium, and coarse pieces of coke, the latter at the top, has, in our own experience, answered admirably.

Purification by means of precipitating agents has recently been the subject of considerable investigation, and the purifying effects of this treatment, both as regards the removal of organisms and of suspended or dissolved matter, are surprising. Purification by this means is best accomplished by

the use of alum. This substance (two or more grains to the gallon will suffice) is decomposed with the formation of a flocculent precipitate (hydrate of alumina, Al<sub>2</sub>O<sub>3</sub>), which rapidly settles and carries down all suspended matter as well as a large proportion of dissolved organic matter. The precipitation is further attended with a very large if not complete reduction in the number of micro-organisms present. In response to inquiries that have reached us from numerous correspondents, we strongly recommend this treatment in lieu of boiling, preliminary to passing the water through a filtering medium of well known purifying powers, such as those we have enumerated. One of the best is, as we have already said, coke. The addition of alum does not interfere with the normal taste of the water, is itself eliminated as alumina in the sediment, removes some of the lime, and, above all, does not de-aerate the water as in the boiling process. By first precipitating, therefore, in the way suggested, and then filtering security is made doubly secure, and the water so treated, which should not be insipid, may be consumed with confidence.

It may be added that tartaric acid or citric acid has been found to be destructive to disease-producing organisms, notably the bacilli of cholera, and an ingenious filter has been constructed in which tartaric acid is first dissolved in the water and then neutralized and removed as calcium tartrate by means of chalk. At the same time the chalk yields carbonic acid to the water, which is thereby agreeably aerated.—*Lancet.*

ONE of the rooms of the Press Bureau, at the Chicago Exposition, has its walls entirely papered with title pages of leading publications from all over the world. These publications include daily papers, religious and trade papers, magazines, etc. A central feature on this wall is the title page of the SCIENTIFIC AMERICAN. Every nation and nearly every colony in every part of the world is represented. The effect of this method of papering is remarkably good.