Science Notes.

It is stated that Huxley's library is now offered for sale.

Dr. Adalbert Kruger, Director of Kiel Observatory, died recently. He was an astronomer of world-wide reputation and was editor of the Astronomische Nachtrichten.

Rev. W. C. Ley, a meteorologist of considerable reputation, died on April 22. His researches were principally on the clouds and the movements of the upper air currents.

The University of Pesth has conferred honorary degrees upon Lord Kelvin, professor in the Glasgow University; Herbert Spencer, the English philosopher; Max Muller, the orientalist; Prof. James Bryce, M. P., the eminent English geologist and scientific author, and Dr. John Shaw Billings, of Philadelphia.

It is said that dew is a great respecter of colors. To prove this take pieces of glass or board and paint them red, yellow, green, and black. Expose them at night, and you will find that the yellow will be covered with moisture, and the green will be damp, but that the red and the black will be left perfectly dry.

Negroes are black owing "to the stimulating action of solar heat, combined with moisture and an excess of vegetable food, yielding more carbon than can be assimilated, the character being then fixed by heredity." This extraordinary theory appears in a recent geographical school book bearing the name of Cambridge University.

The Paruchowitz bore hole, near Rybnick, in Silesia, which attained a depth of 2004·34 m. (nearly 1,096 fathoms) when the rod broke, has passed through eighty-three carboniferous strata, the total expense having amounted to $18,700, says the Practical Engineer. The 384 thermometrical observations that were made showed a very irregular increase of temperature with depth, the average being 1° C. (1·8° F.) for every 35·14 m. (18½ fathoms).

The question as to the fusibility of platinum in a carbon heated furnace seems at last to have been definitely settled by Victor Meyer, says Science. A sheet of platinum completely inclosed in a mass of fire clay was fused to a globule in a blast furnace heated with gas carbon. In this case action of carbon or of furnace gases on the platinum was absolutely excluded. Under similar conditions an alloy of platinum with 25 per cent iridium was unchanged.

Filehne has studied the action of copper when combined with albuminous substances, and finds that a cupratin compound, analogous to Schmeideberg's ferratin, can be administered to dogs and cats in doses of 2·6 grammes within twenty days without injurious effects. He infers that compounds of copper with albumen would not be injurious in human food, and that from 0·01 to 0·02 gramme of copper daily in this form would not cause any sensible disturbance. The case is very different with copper stearate, which causes serious degeneration of the liver and kidneys when administered for some long time, though it was not possible in this way to produce acute poisoning.—Deutsch. Med. Wochensch., 1896.

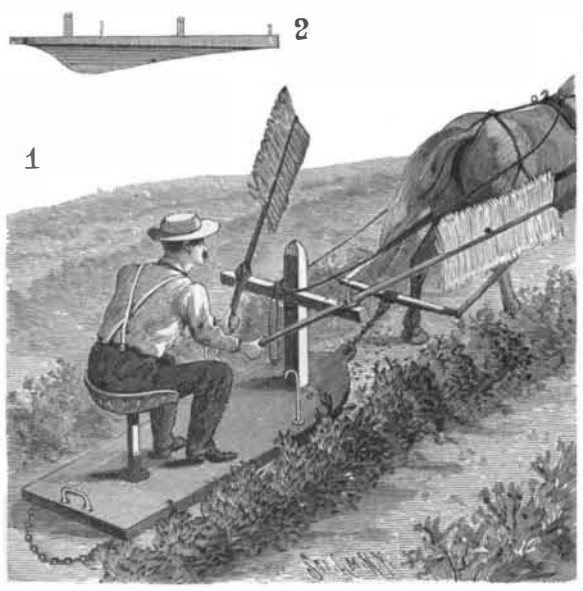
In the Contemporary Review for May, Dr. Alfred R. Wallace describes M. Elisee Reclus' proposed gigantic model of the earth, and argues that the construction of such a globe would be feasible and desirable. But he thinks that the scale proposed by M. Reclus, $\frac{1}{100000}$, should be reduced by one-half. This would give an internal diameter of 167 feet and a scale of almost exactly a quarter of an inch to a mile. The chief point made by Dr. Wallace is, however, that the model should be placed on the inner surface of the sphere.

There has been a volcanic eruption on the island of Socorro, off the Mexican coast. Two months ago, which is the latest date of news received, lava was running down the mountain sides, overflowing the lowlands, and moving toward the sea. The news came in a letter to the Hydrographic Office from the schooner Zampa, bound for Tacoma, whose captain spoke the Danish bark Schwalde, of Guaymas, which passed Socorro on March 20. The sky and sea were filled with ashes miles away from the island, and the blazing mountain was first made out at night. It was a magnificent sight, the Danish captain said, but he did not dare venture too near, on account of the troubled condition of the ocean.

An extremely interesting series of experiments on the action of a powerful magnetic field on the cathodic rays in Crookes' or Hittorf's tubes is described by Herr Kr. Birkeland in the Elektroteknisk Tidsskrift (Christiania). These experiments prove, says Nature, that in such a field the cathode rays are strongly deflected in the direction of the lines of force, and can even be concentrated on to the surface of the tube until the glass melts. Moreover, the evidence suggests that the rays which emanate from one and the same cathode fall into groups, of which the physical constants are connected by some definite law, just as are the frequencies of the different tones emitted by a vibrating rod. The investigation has an important bearing on the theory of the aurora borealis. The Danish meteorologist, Herr A. Paulsen, is of opinion that the aurora owes its origin to phosphorescence of the air produced by cathodic rays in the upper strata of the atmosphere, and Herr Birkeland suggests that the earth's magnetism may be the cause of this phosphorescence becoming intensified in the neighborhood of the terrestrial poles.

INSECT REMOVER AND DESTROYER.

A new and improved machine for the removal of potato bugs and like insects from vines has been patented by Mr. Washington Reeder, of Lake City, Michigan. The invention consists of a machine with

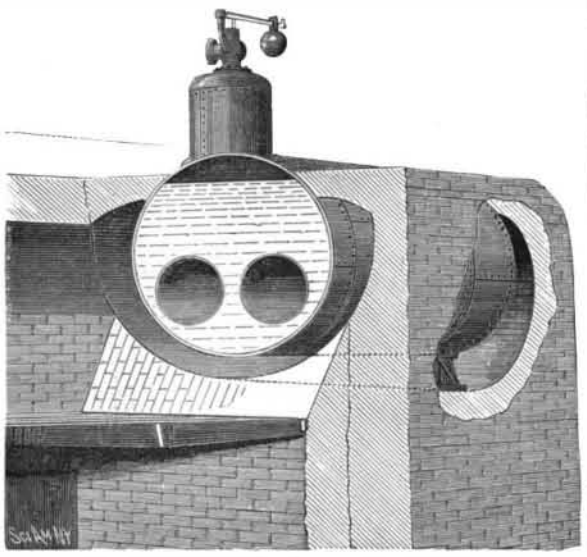


REEDER'S INSECT REMOVER AND DESTROYER.

a body shaped substantially like the hull of a boat, having a pointed front and a rounded keel as shown in the illustration. An upright mast is provided in front of the driver, upon which is fitted a cross bar, at the ends of which are pivoted two oar-like arms, which project on each side of the machine and terminate in brooms or brushes. The inner ends of these oars have suitable handles which can be grasped by the driver, and he is thereby enabled to beat and brush the bug-infested rows of potatoes on each side as he drives the machine through between them. At the front central portion of the body of the machine a clevis is provided, to which the machine may be attached. As the device is driven through a potato field the bugs are brushed into the space between the rows and crushed by the passage of the body of the machine over them.

IMPROVED BOILER FURNACE.

The improved furnace shown in the accompanying illustration has been patented by Mr. Henry Theodore Dieck, corner of Alvar and Dauphine Streets, New Orleans, La. The furnace may be constructed with only one shell, as shown in the illustration, or with two or more shells if desired. At the front end of the shell is a firebox with grate and ash pit of the usual construction. The bridge wall slants upwardly and



DIECK'S IMPROVED BOILER FURNACE.

rearwardly, and terminates in a flame bed, which is segmental in cross section, and has its upper surface eccentric to the exterior surface of the shell, the greater distance between the flame bed and shell being at the upper portion of the former. The flame bed falls slightly toward the rear, where it curves up and over, finishing against the end of the shell just above the shell flues, into which it guides the furnace gases. The flame bed extends upwardly on both sides to or above the shell flues and provides a large heating surface; and as the area of the cross section of the flame bed increases in a rearward direction, ample provision is made for the proper combustion and flow of the smoke and gases, and a superior draught is secured.

The Proposed Extensions of the Manhattan Elevated Railroads.

A committee of the Manhattan Elevated Railroad directors has submitted to the Rapid Transit Commission a comprehensive plan for the extension of their system. Briefly stated the proposed extensions and additions are as follows:

1. A new two track structure to commence at the Battery Place station on the west side and run along West Street to Little West Twelfth Street; then by Tenth Avenue to Twenty-third Street, where a spur would be run from the Pennsylvania and Erie ferry houses to Ninth Avenue. Another spur would run from Christopher Street ferry to the Eighth Street station of the Sixth Avenue line.

2. A cross town line from the City Hall station at the entrance to the Brooklyn Bridge, running up Centre Street to Canal Street, and westward along the same to a junction with the proposed West Street line.

3. To provide increased accommodation and speed on the up and down lines, it is proposed to provide four tracks on the Third Avenue line from Chatham Square to Sixth Street, and three tracks from Sixth Street to the Harlem.

On Second Avenue it is proposed to lay a third track from Grand Street to the Harlem River.

The Ninth Avenue line is to have a third track from the Battery to the curve at One Hundred and Eighth Street, whence a new line is proposed which shall run via Tenth Avenue or the Western Boulevard to Fort George.

Mr. Gould stated that the company stood ready to build these proposed lines at once; and he submitted two other routes which the company were prepared to cover as soon as the growth of the neighborhood called for it. The first of these was a line from the Fort George extension at One Hundred and Sixty-second Street and Tenth Avenue, to run out along the Kingsbridge Road to the city line. The other future extension was to take place from the One Hundred and Seventy-seventh Street terminus of the present line toward the city line to the north. To provide for a pressing need Mr. Gould said that his company was prepared to build at once a branch line from the One Hundred and Forty-ninth Street station on the east side line, running along the Westchester Road to the Bronx River. It is reported that the representatives of the Manhattan roads stated that they were prepared to build the extensions with their own capital and that they made no stipulations as to the payment of damages.

It must be admitted that this proposal is framed on comprehensive lines, and that it appears to meet the pressing necessities of the hour most admirably. The directors of the elevated roads have a rare opportunity just now to establish themselves in the confidence of the public, by pursuing the liberal and far-sighted policy which is outlined in their present proposals.

Explorer Peary's Plans.

Civil Engineer R. E. Peary's plans for his Arctic expedition this summer are now substantially complete. Instead of St. John's, N. F., as in former years, Sydney (Cape Breton) will be the point of departure, from which port the expedition will leave about July 15 in a steam whaler from the Newfoundland fleet. From Cape Breton the course northward will be laid along the Labrador coast, as the conditions of ice will permit; then, crossing Davis Straits to the Greenland coast, stops will be made, if practicable, at Godthaab and Godhavn, and possibly at Upernavik. Lieut. Peary will push forward with all practicable speed to accomplish the main object, the obtaining of the great meteorite, the largest in the world, which he discovered and located not far from Cape York last year. With the meteorite secured, the southern course will be laid across Melville Bay to Godhavn, where a call will be made on the return for the purpose of embarking any of the party who may have awaited the ship at that point. Coming south, an attempt will be made to penetrate Hudson Straits and, if possible, examine some valuable mining prospects which have been reported in an uninhabited and inaccessible place on the north coast of its waters. Calls may also be made at the Labrador ports, if circumstances favor, and it is possible that while the ship is absent Peary may go, if conditions are favorable, north of Cape York, to his former headquarters at Inglefield Gulf. The scientific party from Cornell University, headed by Prof. Ralph S. Tarr, of the department of geology, will embark on the steamer, leaving her at some point agreed upon in Greenland, for scientific field work, during the time of her absence to the north. Prof. Burton, of the Boston Institute of Technology, is also contemplating a similar scientific field excursion, and one or two other passengers may be added to the party. North of Godhavn, however, Mr. Peary will be without associates, excepting the captain and crew of the steamer, whose aid will be ample for the work which he will have in hand. If the expedition accomplishes its designed work and obtains the meteorite, it will return directly to New York.

Notice.

A premium of $250 is offered by the SCIENTIFIC AMERICAN for the best essay on

THE PROGRESS OF INVENTION DURING THE PAST FIFTY YEARS.

This paper should not exceed in length 2,500 words.

The above-mentioned prize of $250 will be awarded for the best essay, and the prize paper will be published in the Special 50th Anniversary Number of the SCIENTIFIC AMERICAN of July 25. A selection of the five next best papers will be published in subsequent issues of the SCIENTIFIC AMERICAN SUPPLEMENT at our regular rates of compensation.

The papers will be submitted for adjudication to a select jury of three, consisting of—

Prof. R. H. Thurston, Cornell University.

Judge A. P. Greeley, Washington, D. C.

Prof. R. S. Woodward, Columbia University.

Rejected MSS. will be returned when accompanied by a stamped and addressed envelope.

Each paper should be signed by a fictitious name, and a card bearing the true name and the fictitious name of the author should accompany each paper, but in a separate sealed envelope.

All papers should be received at this office on or before June 20, 1896, addressed to

Editor of the SCIENTIFIC AMERICAN,
361 Broadway, New York.

Correspondence.

X Ray Experiments.

To the Editor of the SCIENTIFIC AMERICAN:

I have in my possession a Crookes tube, exactly identical in construction with the one described on page 342, SCIENTIFIC AMERICAN of May 30, excepting the glass bulb, which is pear-shaped.

Considering the fact that I am using this tube with an ordinary Wimshurst induction machine of my own construction, with 20 inch hard rubber plates, its work is simply marvelous.

For the benefit of your readers who desire to use this kind of apparatus, I would say that the condensers should be small, not over 16 or 18 square inches of foil surface on each side, and the outside coatings should be connected with each other; the anode of the Crookes tube should be connected to the positive pole of the machine and cathode to the negative pole, with a spark gap of not less than one-half inch. Gap should be made between ball terminals, as a good, clean spark is absolutely necessary; if air is so damp as to break it into a brush discharge, no effect will be obtained in the tube.

The light is, of course, intermittent, but if the machine is in good order and runs fast enough, the sparks follow each other in such rapid succession as to be practically continuous in lighting effect on a fluoroscope, which this tube illuminates brilliantly, bringing out the bones in the hand very distinctly. The tungstate calcium used in fluoroscope is sold by dealers as high as $5 per ounce; but an ounce of it—enough for two or three fluoroscopes—can be made for 30 or 40 cents, as follows: Mix about 1 ounce each of common salt, tungstate soda, and choride calcium; last two articles should be bought at retail for about 2 cents per ounce. Put the mixture in a common crucible, also obtainable for about 10 cents, fit a tin cover to it and bury to the lid in a good coal fire—the kitchen stove will do—so as to bring it to a full red heat; leave it for two or three hours, or until contents are fused to a clear liquid, then set it out to cool and crystallize. The resulting hard, glass-like mass should be broken out with an old chisel or by breaking the crucible—broken up and thrown into a jar of water, which will gradually dissolve the chloride of sodium formed, and the fine crystals of tungstate calcium will settle to bottom. Wash by decantation till all taste of salt is gone, and pour out on filter or blotting paper and dry.

Make your screen of thin wood or cardboard, coat with common prepared glue, and sift on the tungstate, shaking off all that does not stick when dry. Fasten to bottom of ordinary box of the fluoroscope form, and you will have as good a fluoroscope for a few cents as can be bought for a few dollars.

I think I have demonstrated, and with rather poor apparatus, that the X ray will produce a visible image on the sensitive plate in less than 1-1000 of a second.

When I run my static machine very slow, the sparks can be made to jump the gap arranged as described at about the rate of one or less per second. The fluoroscope then shows a distinct instantaneous flash of light as each spark passes, seeming to indicate that the X ray is produced only at or during the instant of the passage of the spark, which, according to Wheatstone, occupies about 1-24000 of a second of time.

Desiring to test the effect of one spark and upward on a plate, I placed a common pocket comb in a metal edged case on a 4 × 5 plate holder, containing plate covering about three-quarters of an inch of holder, with a block of steel one inch thick, and machine slowly run till one spark passed the gap, then plate of steel was moved up three-eighths of an inch, and one more spark passed, thus giving two sparks exposure to remainder of plate; the steel block was then pushed up another three-eighths of an inch, and two more sparks passed, giving four to remainder of plate, and so on up through 8, 16, 32, 64, etc., to 512 on last three-eighths inch of plate. Plate was developed immediately, the print from same plainly showing the metal rim of comb case down to the seventh space from top, corresponding to eight sparks, equal to about 1-3000 of a second's exposure.

My machine works in the open air, which is very damp most of the time at this time of year, but with a properly cased powerful machine and a spark gap of one inch or more, I think it could be shown that one spark would produce a visible image on the plate.

H. C. OGDEN.

Middletown, N. Y.

[We have received from Mr. Ogden some specimens of his X ray photographs, which are very fine; also the photograph mentioned, which shows the images produced by exposures of different lengths.—Eds.]

The Utility of Colored Skin.

Man, no matter what country he inhabits and what are the exterior conditions that he undergoes, has an internal temperature that varies within very narrow limits. If the exterior temperature is very cold, the circulation becomes more active and the chemical changes that generate heat are more intense, while physical conditions, such as friction and perspiration, contribute also a large part toward maintaining this balance of temperature by modifying at the proper time the formation or emission of heat. Races and climate produce in these vital actions certain curious modifications which have hitherto received little attention. It would be, for instance, interesting to know whether the human temperature is the same in all latitudes and for every race. Davy was one of the first to take up this question in two voyages to Barbados and Ceylon. He concluded that the temperature varies with the race by several tenths of a degree as we approach the tropics. The observations of Jousset accord with those of Davy. While other authors have held a different opinion, M. C. Richet, who has summed up the work on this problem, concludes that "the temperature of men of different races, under the same conditions of environment, is sensibly the same." This racial influence is then no greater than that which some have attributed to sex; that is, it is practically null.

Dr. Eijkmann, director of the Pathological Institute of Weltevreden, Batavia, Java, has attacked this question anew. He has especially tried to find how a Malay and a European react under the influence of exterior temperature, and what, in particular, is the role played by the color of the skin in the physical regulation of temperature. He has performed, for the solution of this problem, the following experiments. . . . One means of regulating temperature is by the loss of heat by conduction and radiation. If we place a thermometer near the skin of the arm or the chest and surround it with a sort of guard, the thermometer will rise the faster as the heat given out by the body is greater. M. Eijkmann has made this experiment in both Europeans and Malays. The results differ slightly according to season. During the warm and dry season the advantage is with the natives; the temperature of the thermometer placed near the arm is 33·55° C. [92·39° F.] with Europeans and 34·05° [93 29° F.] with natives. On the contrary, during the cool, wet season, Europeans give 32·75° [90·95° F.], while natives give 32·55° [90·50° F.] The latter have thus radiated off less heat. Observations made at different hours of the day prove that, in general, the loss of heat by radiation is a little less with natives than with Europeans, and this difference is about 0·4° [0·7° F.]

What causes this difference? We must in the first place eliminate the color of the skin. To test this, the author used two exactly similar metal cylinders, covered with skin carefully removed from the shoulders of persons who had recently died. The one was from a European, the other from a Malay. On one cylinder the European's skin was placed outside the Malay's; on the other, the Malay's was outside the European's. This arrangement was to prevent all possible error due to a difference in the conductivity of the two skins. The two receptacles were then filled with water in such manner that the thermometers plunged in each marked at the outset the same temperature. The results of the experiments made under these conditions show that there is no appreciable difference in radiating power between the brown and the white skin. The bulbs of two similar thermometers were covered with a double layer of skin [as before]. . . . Thus disposed they were exposed in a damp chamber to the sun's rays. At the end of a certain time the temperatures were as follows: White skin on outside, 47·5° [117·5° F.]; brown skin on outside, 50·1° [122·18° F.] But we return to the radiation. The color of the skin has no influence, and cannot explain the fact that the loss of heat is a little less in Europeans than in Malays. Other experiments give us the true reasons, which relate to the evaporation that takes place at the surface of the skin, which is greater in Europeans because they drink more.—Paris Cosmos.

Study of a Swiss Avalanche.

Natural Science gives a summary of the report made by Profs. Heim, Forell and Chodat on the great Gemmi Passavalanche of September 11, 1895. The detailed description of the results of the catastrophe made by men of good standing in the scientific world is of great value. The avalanche was caused primarily by the splitting away of the lower parts of the Altels glacier.

The Abstract says: "On reaching the foot of the Altels, the avalanche, which up to this point must have consisted of one vast moving block of ice, measuring one and a quarter millions of cubic meters [4,000,000 cubic feet], was reduced to fragments, at the same time that the heat generated by the shock converted these into a semi-fluid condition. Among the debris were to be seen some blocks of considerable size, but only a few exceeded two meters [6½ feet] in diameter. With the velocity acquired in its descent, this river of ice rushed across the pasturage and up the western slope of the valley to a height of 1,300 feet along the rocky wall of the Weissfluhgrat. Not being completely able to surmount this barrier, the main mass came surging back—like a vast sea wave recoiling from the cliffs—with such force that some of it returned to a height of one hundred feet up the eastern side. Isolated blocks, however, were hurled clear over the ridge into the adjoining valley, the Uschinenthal.

"The avalanche was preceded by a terrific blast of wind which swept away chalets, trees, men, and cattle as though they had been feathers. This is proved by the fact that, far above the limit reached by the avalanche, hundreds of trees have been uprooted, and lie in regular rows, indicating with mathematical exactitude the direction of the aerial current. These trees are for the most part of great size, several indeed having trunks one meter in diameter. Such as were protected by a large rock or a reverse dip on the hillside have been spared. Others, standing with only half their height above such hollows, have had the exposed part blown off, while the subsequent oncoming of the avalanche has not succeeded in tearing up what was left of them, even when it has enveloped their base. This wind produced a veritable bombardment of ice dust mixed with stones, which has stripped the roots and branches of the trees laid low by the wind itself, and which must have killed man and beast before ever the real avalanche overwhelmed them. Further away the trees have only been denuded of their upper portion, the branches composing which were transported to a great distance, and now form a compact line of debris among the far-off scattered trees, like the bank of sea wreck left on open coasts after a fierce storm. Ice bombs, too, round like cannon balls, out with an average diameter of one foot, which lay all about in the neighborhood of the fallen mass, bore eloquent testimony to the extreme violence of the wind. On the way from the Hotel Schwarenbach, before coming to the Bernese frontier, the green pasture was strewn with these balls like a battle field in old muzzle-loading times.

"The true avalanche, in its recoil from the rock wall, has formed an immense rampart, separated from the rock by a deep trench. On the sides, under the stress of the enormous power of the wind, which, like the avalanche itself, was deflected by the Weissfluhgrat, blocks of considerable size were driven around as in a whirlpool, so as, at least on the northern edge, to have been forced back up the slopes of the Altels toward the entrance of the gorge leading to Kandersteg. These different atmospheric motions were well marked, owing to the disposition of the materials which came under their influence. Near the Winteregg, the trees, shrubs, and grasses were all bent toward the north, forming an exterior zone, which was more and more thickly covered with the dust, etc., raised by the catastrophe as the central mass was approached. A second zone, within the first, was found to consist of the loose rocks, etc., thrust aside by the head of the ice mass as it dashed up the west slope; the inner edge of this zone was itself covered by a layer of ice and snow, representing the matter that kept pouring off from the sides of the central body in its upward progress, and also the results of the reflux which took place when its further advance was barred. Some of the ice and stones hurled against the Weissfluhgrat had adhered to it, being plastered, as it were, into the fissures and gullies. These masses were being constantly detached from their precarious position, and kept descending in roaring avalanches."

DR. ROENTGEN has published some new facts about his rays. He finds that all solid bodies can generate them; the only difference being in the intensity, the greatest intensity being produced by platinum. He finds that the insertion of a Tesla coil between the Ruhmkorff coil and the ray-producing apparatus is very advantageous, and that the X rays and the air traversed by them can discharge electric bodies.