

of light is far from being confined to the surface and to the illuminated portion of the cell, as mostly supposed, being transmitted all over the cells and penetrating even to a certain depth. Special selenium cells in the case of their being uniformly illuminated did not show any inertia, reacting instantaneously on any modification in the light they are struck by. The resistance of all the cells investigated, after reaching a minimum on being illuminated, would begin increasing again with continued illuminations in order to become constant after some time.

As regards the cause to which the photoelectric properties of selenium should be attributed, the author is opposed to Bidwell's opinion, according to which these would be due to metallic impurities contained in the selenium. Mr. Marc purposes continuing these researches and publishing any further observations in due course.—A. G.

NEW STYLES FOR WOMEN AUTOMOBILISTS.

THE fantasticalness, the hideousness even, of certain costumes or of the accessories of costumes that have been devised for the use of female chauffeurs must forever have restrained all pretty women from indulging in the sport of automobilism, were anything capable of discouraging a woman when it is a question of tasting a pleasure or merely following a fashion.

To conceal or to disguise a figure that is often a fine one in the loose folds of an ugly duster, to con-



THE VEIL WITH GOGGLES.

fine one's self in heavy and vulgar furs and sometimes even to risk a stiff and malodorous leather cloak, all that is nothing. But notice what contrivances have been manufactured for protecting against freckles and sunburn faces which, not long ago, would never have consented to venture upon the beach or in the country in broad daylight, were it but to escape the necessity of wearing a thick veil that deprived them of a portion of their endowments. Still, in such a case, a stylish woman would have had the resource of a parasol, the swinging of which, in expert hands, has all the grace of the flourishing of a fan. But, when one is making thirty miles an hour upon some dusty road or other, the parasol is unfortunately prohibited, and nothing remains but the veil, as thick as barege, or the varied masks that humorous costumers have taxed their wits to create, in merely endeavoring to render them practical and efficient without caring anything for beauty. It seems evident that the two terms are



ONE OF THE PRETTIEST WOMEN OF PARIS.

irreconcilable, since, with rare exceptions, inventors have discarded oddness only to adopt ugliness. One of them devises a sort of armor of cloth, a genuine half-mask, in which the eyes are covered with huge

convex goggles, while a hood envelops the head and protects the hair against dust. Another, preserving the glasses, covers the entire face with cloth, leaving at the base of the nose a wide aperture that gives the patient, so to speak, the head of some sort of fantastic bird, a cross between the parrot and the



THE HALF-MASK WITH HOOD.

harpy. Another, with a view to doing better, has endeavored to give the mask, with which he covers the entire face, the appearance of life by modeling and enameling it, but without succeeding in lessening the painful and irritating impression that a face thus disguised always gives. Still another, in an effort toward elegance, has simply set into a lace veil the huge goggles of a Chinese scholar that had been adopted by his competitors.

A number of female devotees of automobilism, however, scorning such complicated and barbarous devices, are content to fasten around their caps a tastefully ruffled veil of more or less opacity. The face is thus entirely concealed, but is neither deformed nor rendered grotesque, and is perfectly protected against the elements.

If we are to believe the English journals, the female chauffeurs of the other side of the Channel have an aversion to such extreme measures, and are loth to consent to mask their features and disfigure themselves in this manner, but stick to the veil and leave the physiognomy quite apparent. Evil-minded persons, smiling ironically, will doubtless be led to recall a bit of dialogue between an Englishman and a Frenchman (two diplomats, we believe) at the moment of the signature, by Napoleon, of a treaty of peace in which he claimed quite a heavy pecuniary indemnity.

"You people are very astonishing," said the Englishman, "thus to exact money for the cost of a war. For



THE FALSE-FACE.

our own part, we are content to fight for glory simply."

"What would you have, my lord?" said the other banterer. "People always fight for what they have not got!"

It is to be believed, that in the case that occupies us, our sporting women are so sure of their superiority as regards elegance, and so confident of their charms, that they do not hesitate to sacrifice a portion of them in exchange for a great pleasure, being uniformly preoccupied with the delight that they find in driving upon the highways, at full speed, and not with the effect to be produced upon passersby.

In order to obtain an idea of the infatuation possessed at present by the sports that permit the poor sedentary citizen, made a prisoner by his occupation, to enjoy at one time and another, on Sundays and holidays, the open air, the country, and free space, as well as to obtain an idea of the popularity of the higher class of amusements, there is nothing better than a halt of an hour or two, on the evening of a fine vacation day, at the Suresnes bridge, the confluence of a certain number of roads that lead to famous excursion points. Here there is an astonishing, a bewildering pell-mell of bicycles and automobiles pass-

ing in a torrent before the amazed eyes of the pedestrians, who have prudently taken refuge upon the sidewalks; a compact torrent that the police, club in hand, do not always succeed in mastering; a swift current in which are compounded the most diverse elements—correct bicyclists upon their machines of the latest type returning from some very select pleasure party, more modest cyclists plainly equipped, and luxurious automobiles kept at a slow speed in the crowd and trembling like racehorses that are held in check, but that the vertiginous race has not wearied.

And the beautiful lady chauffeurs, with blood in the cheeks behind the thick veil or the somewhat carnivalesque mask, recapitulating the sensations of the recently finished excursion, are doubtless saying to each other that, all things considered, the pleasure of annihilating space and of going at full speed in accordance with one's fancy and caprice, is well worth one's resigning herself to a seeming ugly—or at least questionable—appearance for a few hours.—Translated from L'illustration for the SCIENTIFIC AMERICAN SUPPLEMENT.

RECENT STUDIES OF RADIUM AND RADIO-ACTIVITY.

J. HÄRDIN, in Phys. Zeitschr., states that crystals of uranium nitrate shaken in a glass tube give off a yellowish-green shimmering light. In a tube containing air at ordinary pressures, they enable the air to act like the rarefied gas in a Geissler tube; but the light produced has no photographic and no fluorescence-exciting power when a dark card intervenes. An ordinary induction coil brings out this effect better than a Tesla coil. A magnetic field does not induce luminescence.

W. Kaufmann, in Ann. d. Physik, refers to Geigel's



THE MOST STYLISH ARRANGEMENT.

paper on the absorption of gravitational energy by radio-active bodies. The same results can be obtained whether there is or is not any radium in the dish under the mass of lead, provided the dish has been put in place with the fingers; the effect therefore seems thermal and due to feeble ascending currents of warmed air. In the absence of this cause, radium chloride produces no effect beyond the limits of experimental error (equally + and -, 0.0005 mg. on 10 grammes). Geigel's alleged dependence of the effect upon the breadth of the radio-active material is explicable as depending on the breadth of the ascending air-current.

G. C. Schmidt, in Ann. d. Physik, refers to his former account of experiments on the emanations from phosphorus and describes extended observations from which he deduces the following conclusions: For the appearance of ions or electrons in the case of the slow oxidation of phosphorus, no example has hitherto been brought forward. The conductivity arising through the oxidation of phosphorus is only an apparent one, which is caused by the convection of electricity by means of solid fog-like conducting products of oxidation. The conducting particles are the phosphorus acids.

A. Debierne, the discoverer of actinium, considers in Comptes Rendus the behavior of actinium. He notes that the action takes place as if the activation was produced by a peculiar radiation sent out by each of the centers of energy (emanation), the activation of a layer placed in an inclosure with actinium being proportional to the total flux of radiation that it absorbs. Debierne's experiments appear to indicate that there exists a new radiation characterized essentially by the property of temporarily rendering radio-active the bodies on which it strikes. This "activating radiation" proceeds from activating centers within the gas in the neighborhood of the actinium. The new rays can be deviated by a magnetic field and by an electric field, the deviation being such as would occur in the case of positively charged particles animated with a high velocity.

In the Phil. Mag. E. Rutherford and F. Soddy give a comparative study of the radio-active properties of thorium and radium. These properties are closely allied, though there is a great difference in their relative activity. The occlusion of the emanations is considered, and the influence of the emanation on the radio-activity of radium. The rate of decay of radium emanations and the recovery of radium activity are expressed by means of curves. Radium, like thorium and uranium, emits two types of radiation, the α , easily absorbed, and only deflectible in very intense magnetic fields, and the β , or penetrating rays, readily deviated in a magnetic field. It also emits some very penetrating rays not yet fully investigated. The X-rays are the first to be produced, the μ -rays only resulting in the last stages of the process that can be experimentally traced.

The influence of radium on the growth of embryos is studied by G. Bohn in *Comptes Rendus*. Embryos of toads and frogs are exposed to the radiations from radium bromide for from three to six hours. The growth of toad embryos, which is normally slow, is inhibited. Frog embryos eight days old rapidly change into tadpoles, but become deformed in various ways. Younger individuals at first appear uninfluenced by the rays, but when they develop into tadpoles, they show similar deformities. A few of the embryos die almost immediately after this treatment.

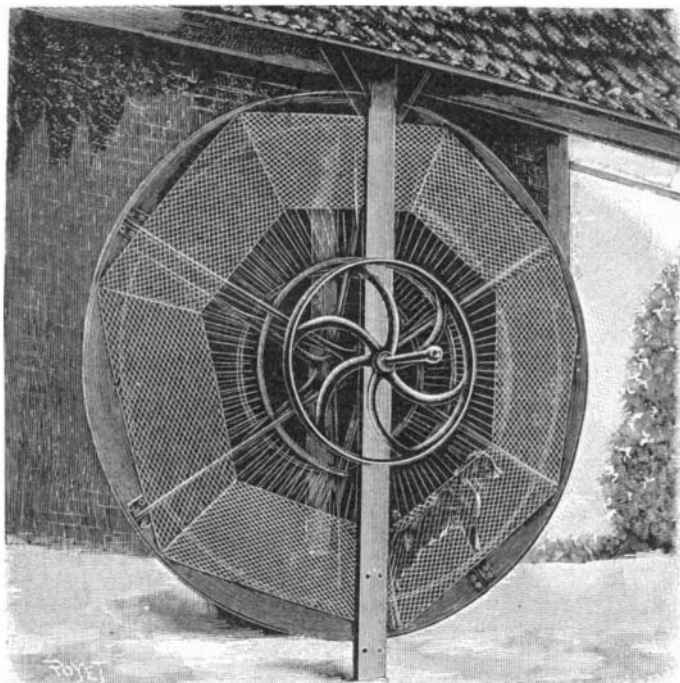
R. J. Strutt, in *Nature*, points out the importance of determining whether radium, as contained in pitchblende, emits as much energy as the same amount of the material in the form of an artificially concentrated product. The mineral has probably been liberating energy at not less than its present rate for a period of time comparable with the age of the earth. The author estimates that at the center of an infinite slab of pitchblende one meter thick, the temperature would exceed that at the faces by about a fifth of a degree, so that the effect could probably be measured experimentally.

Recent experiments have confirmed the conclusion that freshly made thorium preparations are strongly radio-active to different degrees according to the amount of uranium contained in the mineral. Pure thorium and its compounds possess in themselves no primary activity, inactive thorium earth having been obtained from orthite, yttrite, and gadolinite, the oxide from the latter mineral being unable to affect a photographic plate through thin black paper in twenty-four hours. The gadolinite has the property of suddenly glowing throughout its whole mass on heating.

E. G. Willcock exposed animals of simple structure to radium-rays with a view to determine (a) whether the rays would cause an immediate contraction; (b) whether they would repel or attract animals bodily. Under (a) it was found that actinosphaerium, with pseudopodia extended, did not retract its pseudopodia when exposed in daylight to 10 mgm. of radium at 3 mm. distance. In two hours, however, it was dead and breaking up; controls were unchanged. *Stentor* contracted when exposed to radium emanations. Under (b) it was shown that *Stentor* and *Hydra* (both viridis and fusca) moved bodily out of the path of μ rays; weak specimens were killed. Encysted specimens of *Euglena viridis* become motile under the influence of β and γ rays, and disperse without suffering any harm.

MUSCULAR EXERTION AS AN ELIMINANT OF ALCOHOL IN THE BLOOD.

I HAVE for a long time been studying ethylic alcohol



WHEEL FOR DEMONSTRATING THE INFLUENCE OF MUSCULAR EXERTION UPON THE ELIMINATION OF ALCOHOL FROM THE BLOOD.

from the standpoint of physiology and hygiene, and have demonstrated by experiment that a measured volume of this liquid, introduced into the stomach of an animal by means of an oesophageal canula, passed into the blood, wherein I have examined its proportions for several hours in succession by means of the

very exact and ingenious bichromate of potash process devised by my pupil and preparator, Dr. Nicloux, in 1896.

A very large number of quantitative analyses have permitted me to construct curves that show that, in the hours following its introduction into the stomach, the proportion of alcohol remains absolutely fixed and there forms a Grehaut "plateau." All the symptoms, acute or chronic, produced by ethylic alcohol in the animal organism, are due to the existence of this plateau, which represents a constant proportion of alcohol in



THE KERN BURNER AND THE CLAMOND STOVE.

the blood that afterward diminishes at the end of 6 or 7 hours or a longer time, the curve not reaching the time of the abscissas until after 21 or 23 hours. If the alcohol burns in the organism, its combustion is slow and requires much time.

I cannot just now summarize my researches, but I wish to point out to my readers a fact of which the demonstration has been begun by me and which, I hope, will give rise in the future to a large number of comparative researches of great interest. It is a question of knowing within what limits muscular exercise favors the disappearance of alcohol from the blood that it has entered, by stomach absorption, pulmonary inhalation, or by direct injection into the blood-vessels.

I have very recently made known to the Society of Biology the results that I have obtained by a dog-power wheel similar to that employed before me by Prof. Chauveau and Profs. Laveran and Regnard, my learned colleagues of the society.

The accompanying figure represents this wheel, which is about ten feet in diameter, and which I have installed against a wall outside of my laboratory and under a roof. Any dog, introduced in the wheel begins to revolve it without hesitation at the first trial, and can continue to make from 10 to 20 revolutions, according to his gait. Ten revolutions correspond in one hour to a travel of 3.3 miles.

At 8 o'clock in the morning I inject into the stomach of a dog 0.675 fluid ounce of alcohol to 5 per cent. per pound of its weight. Five hours afterward I introduce into the jugular vein in the left side a fine canula and suck 0.5 fluid ounce of blood and inject it into my distilling apparatus in a vacuum. In a few minutes I obtain the total amount of alcohol and water that the nourishing liquid contained.

be obtained a bluish-green color, while 0.17 fluid ounce of alcoholic liquid heated with 0.034 of bichromate will give a slightly yellow solution that will indicate in the reaction the limit discovered by Nicloux.

Three samples of blood are taken from the dog at 3, 6, and 7 hours after the stomachal injection. We find from the curve that a descending straight line has been obtained. Then the animal is introduced into the wheel and made to revolve it for an hour without interruption. New quantitative analyses of alcohol show that the line becomes broken and makes an

angle of 14 deg. with the primitive direction. In the following hour of rest, the curve indicates a more feeble elimination of alcohol.

It is therefore certain that muscular exercise favors the elimination of alcohol from the blood, and it ought therefore to be recommended to those who have introduced into their organism a quantity of alcohol less than that which produces intoxication and renders walking impossible. In the latter case, I think that motion communicated in the open air, in a carriage for example, might be useful; but it would be necessary to demonstrate it experimentally.—N. Grehaut. Translated from *La Nature* for the SCIENTIFIC AMERICAN SUPPLEMENT.

THE KERN BURNER.

The Kern burner is a new modification of the Bunsen type, constructed with a view to effecting a thorough mixture of the air and gas, and at the same time of directing the stream evenly and directly upon the surface to be raised to incandescence.

Our illustration shows the different parts of this burner. It consists of the usual gas jet, mounted in a nut which screws into the lower end of a tube narrowing toward the center and widening at the ends. The shape of this tube, more precisely, is a hyperboloid of revolution. At the base, near the gas jet, are four windows to admit air. The gaseous mixture passes up the tube, arriving at the top under a perforated cone, where a more thorough mixing takes place; it then enters a chamber above the cone, whence it issues through a grating, passes over a double cone, and ultimately leaves the burner by escaping between the beveled teeth of a horizontal wheel, being by this device directed toward the flame in a regular cylindrical stream. The gaseous mixture, in passing through the perforated cone, becomes heated, and is already at a fairly high temperature when it reaches the flame.

The flame is very suitable for use with Welsbach mantles. In that case a rod of magnesia is fixed at the top of the burner to support the mantle in the usual way.

Several different models of the burner have been constructed on this plan for consumption varying between 14 and 200 liters per day (1/2 to 7 cubic feet). According to the pressure, the quality of the gas, and the nature of the mantle, the consumption per candle hour is 1 to 1 1/2 liters of gas (1.30 to 1.20 cubic foot).

The Kern burner has also been used by Mr. Clamond for heating purposes. In our illustration a stove constructed on this principle is shown. The mixed gases pass into a little reservoir, in which is placed a perforated cylinder similar to the cone of the Kern burner. From this chamber the gases, now thoroughly mixed, are distributed to a series of perforated cylinders of fire clay, where the mixture issues from the meshes and burns, raising the fire clay to incandescence. An intense heat is thus obtained; the products of combustion are led off to a flue in the ordinary way.

The working of these burners has been carefully investigated by M. A. Leconte. An analysis of the products of combustion shows that they consist entirely of carbon dioxide and water vapor, without any trace of carbon monoxide, for which careful tests were made. Besides offering this advantage of giving rise to no noxious products, the Clamond stove has a very constant action and is very economical.

American Farm Implements in Austria.—American farm machinery does not find a ready sale here. Cheap labor, small farms, and the stony and hilly character of the land render the employment of machinery unprofitable, and sometimes impossible. But I am satisfied that many of our farm and garden tools could be successfully introduced if systematic efforts were made