

Science Notes.

The University of Utrecht celebrated the twenty-sixth anniversary of its foundation on June 22 and the five following days.

A case of complete and immediate relief from the effects of ivy poisoning is reported in the Medical World by Dr. W. L. Shanks. His patient was swollen from head to foot, but in an hour after bathing in a solution of sodium hyposulphite was attending to business as if nothing had happened.

Science states that the extended use of small pilot balloons would result in giving us much valuable information as to the air currents in and around clouds. These balloons, which are cheap, reach considerable altitudes and are especially useful in indicating the drift of the air currents when there are no clouds in the sky, the direction of the lower currents when only the upper currents are visible, etc.

Observations made by M. Perrotin on Mount Mounier, at an elevation of about nine thousand feet above the sea, have convinced him that the period of the rotation of the planet Venus is equal to that of her revolution round the sun, the time of both being two hundred and twenty-five days or less. The observations were carried out in December of last year and in February, 1896.

Shillington (Montreal Medical Journal) reports the case of a man thirty years of age who was exposed to illuminating gas for about ten hours, and at the time he was found was profoundly asphyxiated. Artificial respiration, strychnine and the faradic brush were employed, which caused temporary improvement; but, the condition becoming worse, oxygen was employed, with immediate and slow improvement in all symptoms. In all about fifteen gallons were used in the course of eight hours. The reporters are firmly convinced that if this remedy had not been used, their patient would have died.

An account is given in the Physical Review by R. A. Millikan of some careful tests of light emitted by glowing solids and liquids, with a view to discover the laws of its polarization. This phenomenon is exhibited strongly by incandescent platinum, silver, gold, and by molten iron and bronze; a somewhat feeble polarization is shown by copper, brass, lead, zinc, and solid iron. The most significant result named is that polarization is minimum with rays emitted normally to the surface and maximum at a grazing emission, thus indicating that the vibrations take place in a plane at right angles to the emitting surface. Glass and porcelain also emit polarized light, but to a lesser amount; fluorescent bodies do the same, so that evidently a high temperature is not necessary; and in the case of uranium glass it is said to be the green reflected light which is polarized, and not the blue incident light diffused from the surface.

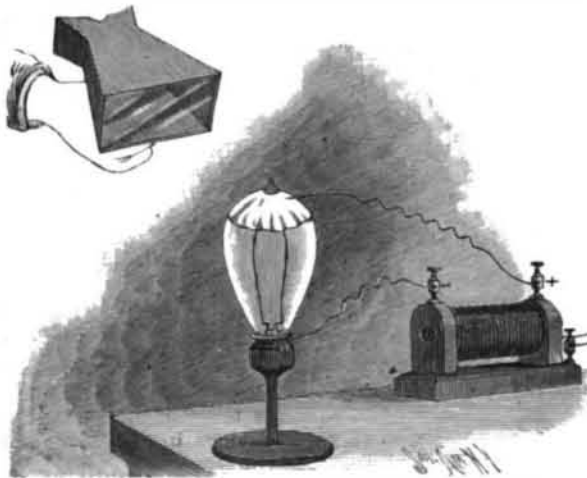
The first of the two annual conversazioni of the Royal Society was held on May 6, says Science. The exhibits included X ray photographs by Messrs. Swinton, Jackson and Sydney Rowland. Mr. F. E. Ives exhibited his method of color photography and Prof. Mendola gave a demonstration by means of the electric lantern of Prof. Lippmann's color photographs by the inferential method. Prof. Worthington showed photographs of the splashes produced by a falling drop of water taken with the electric spark, the exposure being less than three millionths of a second. A method was shown by which two or three thousand copies of a photograph can be printed, developed and fixed in an hour. The exhibits seem to have been largely in photography, but in addition Prof. Dewar repeated his experiments with liquid air, and the new binocular field glasses and stereo-telescopes of Mr. Carl Zeiss were exhibited.

Novak and Sulc have examined nearly 300 substances on the absorption of the Roentgen rays by chemical compounds. Their method of investigation consisted in attaching rings of glass to a sheet of paper and placing uniform layers of the finely pulverized materials in the different rings, so that the thickness of the layer was 0.4 cm. in each case. The paper with the rings was then placed over a photographic plate which was enveloped in black paper, and exposed to the Roentgen rays for a period of 20 to 25 minutes. By comparing the photographic effect of the rays where the substances were interposed, the relative absorptions were determined. The authors found, says the American Journal of Science, that a great number of organic compounds containing only carbon, hydrogen, oxygen and nitrogen are equally penetrable, and hence they conclude that the absorption has no relation to molecular weight or the arrangement of the atoms. Organic halogen derivatives were found to possess much greater absorption, which increased with the number of halogen atoms present. This effect increased with the atomic weights of the halogens, two atoms of bromine having a greater effect than six chlorine atoms, while iodine derivatives were entirely impenetrable under the conditions used in the experiments. This indication of the influence of elements of varying atomic weight led the authors to examine a series of elementary substances, all of rather low atomic weights.

INEXPENSIVE X RAY APPARATUS.

The expense of special Crookes tubes, powerful coils, and batteries has deterred many from entering this interesting field of experiment; but Mr. R. McNeil, of this city, has recently devised apparatus in which an ordinary incandescent lamp is substituted for the Crookes tube, and an induction coil of common form is made to supply electricity of sufficiently high potential to produce the X ray phenomena.

The lamp, which is a 52 volt, 16 candle power Sawyer-Man lamp, is made of German or lime glass. For convenience, it is mounted in an insulating standard. The top of the lamp is covered with aluminum



X RAY EXPERIMENT SIMPLIFIED.

foil, which is connected with one terminal of the secondary of the induction coil, and the bottom is connected with the other terminal of the secondary, as shown. The X ray proceeds from the cathode. By means of the fluoroscope the shadows of the bones of the hands and feet, also of the limbs, may be seen, when they are placed between the instrument and the lamp.

It has been found in this experiment that when a blue fog appears in the lamp, the vacuum is too low for the best results. By placing the lamp in the house circuit for fifteen or thirty minutes the high vacuum is restored by the heat and will remain good for about fifteen minutes.

The coil is capable of giving a three inch spark, and the X ray produced by this simple and inexpensive apparatus is sufficient for making radiographs.

THE DANCERS.

We present an illustration of one of the toys of the year. It consists of a nickel plated box some three inches in diameter. In the center of the top projects the end of a spindle, and at one side is a lever. To operate the toy this side projecting piece is pulled out,



THE DANCERS.

and one of the triangular pieces of tin to which paper figures are attached is placed in contact with the spindle in the top of the box. The dancers then begin a lively waltz on the top of the box. The secret of operation is not at first apparent, though it is evident that magnetism has something to do with it. On opening the box the mystery is solved. The spindle is of magnetized steel and extends through the top of the box, forming a slight projection. It turns freely and carries a pinion and a metal disk. The pinion is actuated by the projecting side piece through the medium

of a toothed sector. Motion is transmitted to the triangular piece of tin carrying the dancers by the magnetized spindle causing a horizontal movement, giving it a movement around its own axis. Curved wires and a spiral, one side of which is colored, are also provided, and they all move around the pin at a lively rate, producing novel effects.

A Homeric Fight at Sea.

We were cruising in the Strait of Malacca, between the Nicobars and the Malay Peninsula, and had succeeded in killing a full-sized sperm whale. He had been a tough customer, needing all our energies to cope with him; but a well-directed bomb closed the negotiations just before sunset. As usual, he had ejected the contents of his stomach before dying, and we specially noticed the immense size of some of the masses floating about. By common consent they were about as large as our hatch-house, which measured 6x6x8 feet. I must very distinctly state that these masses were not square, but irregularly shaped masses, bitten or torn off in blocks from the body of some gigantic squid.

The whale was secured alongside, and all hands sent below for a good rest prior to commencing to "cut it" at daybreak. I had the watch from eight bells to midnight, and at about 11 P. M. was leaning over the lee rail, idly gazing seaward, where the rising moon was making a broad lane of silvery light upon the smooth, dark waters. Presently there was a commotion in the sea, right in the way of the moon, and I immediately went for the night glasses to ascertain, if possible, the nature of it. In that neighborhood there are several active volcanoes, and at first I judged the present disturbance to be one of these, sending up debris from the sea bed. A very short examination satisfied me that the trouble, whatever it might be, was not of volcanic or seismic origin. I called the captain, as in duty bound, but he was indisposed to turn out for anything short of actual danger; so the watch and I had the sight to ourselves. We edged away a little under the light draught of wind, so as to draw nearer to the scene, and presently were able to realize its full significance. A very large sperm whale was engaged in deadly conflict with a monstrous squid, whose far-reaching tentacles enveloped the whale's whole body.

The livid whiteness of those writhing arms, which enlaced the cachetot like a nest of mighty serpents, stood out in bold relief against the black bowlderlike head of the aggressor. Presently the whale raised itself half out of the water, and we plainly saw the awful-looking head of the gigantic mollusk. At our distance, something under a mile, it appeared about the size of one of our largest oil casks, which held 336 gallons. Like the rest of the calmar visible, it was of a peculiar dead white, and in it gleamed two eyes of inky blackness, about a foot in diameter.

To describe the wonderful contortions of those two monsters, locked in a deadly embrace, is far beyond my powers, but it was a never-to-be-forgotten sight. The utter absence of all sound, for we were not near enough to hear the turmoil of the troubled sea, was not the least remarkable feature of this Titanic encounter. All around the combatants, too, were either smaller whales or immense sharks, who were evidently assisting in the destruction of the great squid, and getting a full share of the feast. As we looked spellbound we saw the writhings gradually cease and the encircling tentacles gradually slip off the whale's body, which seemed to float unusually high. At last all was over, and the whole commotion had completely subsided, leaving no trace behind but an intensely strong odor as of a rocky coast at low tide in the full blaze of the sun. Since that night I have never had a doubt either as to the origin of all sea serpent stories or the authenticity of the old Norse legends of the kraken; for who could blame a seaman witnessing such a sight, and all unaccustomed to the close observation of whales, for reporting some fearsome monster with horrent mane and floating "many a rood"?--Nature.

It is well known that the bones are relatively opaque to the X rays, and that this opacity is due to the chemical composition of the fundamental bony tissues, which are made up of calcium salts (phosphates, carbonates, and fluorides). The question would then be a natural one, whether, by introducing a salt of lime into the veins, they could be made to leave a shadow on the photographic plate. The Physical Institute at Rome has performed this experiment. Into the brachial artery of a dead body was injected a paste of sulphate of lime, sufficiently liquid to penetrate all the blood vessels, and then, after it had hardened, the hand was photographed, the Crookes tube being held at a great distance, so that the shadows would be very sharp.--Cosmos, Paris.

AN American firm has obtained a concession to build a railroad between Seoul and Chemulpo, in Corea, a distance of 30 miles.

#### Sauces for Tobacco.

Nearly all tobaccos are treated with sauces before being made up into their commercial form, says the Boston Evening Transcript. By this means they are flavored in various ways, so as to adapt them to the tastes of consumers. The tastes of consumers vary in different localities, and to make his goods to suit is the business of the manufacturer. Each manufacturer has his own secret receipts, which are handed down from father to son. Tastes differ, even among people of various occupations. Miners, for instance, want a very strong tobacco, with a scent and flavor which another class would not relish. Outdoor workers in general like a stronger tobacco for smoking and chewing than indoor folks.

Nearly all tobaccos, in fact, are doctored. Sometimes it is done in an illegitimate way, for the purpose of deception. Ordinarily, however, it is honest and even necessary. One object of it is to make the tobacco keep better. Without such treatment it would become so much dry leaves, the aromatic properties passing off. Niter is added to smoking tobacco in order to make it burn well. The leaves intended for chewing are steeped in licorice or other gum, in order that the plug shall have the requisite consistency and sweetness. Mucilaginous substances in small quantities are added to cigarette tobacco, so that the particles may hold together and not fall out of the paper wrapper. Some pipe tobaccos are heavily charged with perfumes by treating them with essential oils of rose, verbena, citronelle, bergamot, cassia, musk, and catechu.

It is not true that cigarettes are commonly charged with opium and other injurious drugs. However, they are flavored with essences of various plants, such as vanilla, cascarilla, stramonium, coffee, valerian, and tea. Occasionally a few tea leaves are mixed with the tobacco. These flavors are matters of fancy, and women particularly select their cigarettes with reference to them. Scarcely a plant that will yield an agreeable flavoring escapes employment by the manufacturers of tobacco. Among those most used are the lemon, the orange, geranium, sassafras, thyme, anise, mint, and cinnamon. Honey and maple sugar are utilized for sweetening. A decoction of hay is sometimes applied to smoking tobacco.

The basis of a "sauce" is nearly always some spirituous liquor—usually rum. Sometimes wine is used. Glycerine is a common ingredient. More or less molasses enters into the composition of much plug tobacco. The rum preserves the tobacco, and adds to the flavor of the plug. The plug trade for the United States navy is large, and it is required by the government that the tobacco furnished in this shape for the use of its sailors shall contain no foreign substances, except a limited percentage of licorice. The tobacco leaves are dipped into the sauce or else sprinkled with it.

#### Death of Niagara Falls.

Fifteen hundred years ago the terrestrial movements raised the Johnson barrier to the Erie basin so high that the waters of that lake reached not merely the level of Lake Michigan, but the point of turning all the water of the upper lakes into the Mississippi drainage by way of Chicago. But the falls were then cutting through the ridge, and when this was accomplished, before the change of drainage was completed, the surface of Lake Erie was suddenly lowered by many feet, and thus the falls were re-established for some time longer.

Slowly, year by year, one sees the cataract wearing back and suggesting the time when the river will be turned into a series of rapids; but another silent cause is at work, and one not easily seen—namely, the effects of the changing of level of the earth's crust. From the computations already referred to it was found that for the first twenty-four thousand years of the life of the river only the Erie waters flowed by way of the Niagara River, and for only eight thousand years have all the waters of the upper lakes been feeding the falls. If the terrestrial movements continue as at present, and there appears no reason to doubt it, for the continent was formerly vastly higher than now, then in about five thousand years the rim of the Erie basin promises to be raised so high that all the waters of the upper lakes will flow out by way of the Chicago Canal. Thus the duration of Niagara Falls will have continued about thirty-seven thousand years. But the lakes will endure beyond the calculations of the boldest geologist.—Appleton's Popular Science Monthly.

#### Underground Temperatures.

The question of the rate of increase in temperature from the surface of the earth downward has long been one on which prominent authorities differ, and no law on the increase of temperature expressed in arithmetical progression has ever been found applicable in a universal sense.

Among the scientists who have recently given this subject considerable thought is M. Joseph Libert, who records observations made at Produits colliery, Flenu, Belgium. These observations, owing to the depth of the shaft, have been carried to a depth of 3,772 feet.

Taking 82 feet as the depth at which atmospheric variations of temperature cease to have any influence, it was calculated that the rate of increase of temperature given by the tests at Flenu was 1° Fah. for 53.97 feet of vertical depth. This result agrees closely with that obtained some years ago by M. Cornet in the same district, his rate of increase being 1° Fah. for 54 feet, only, however, for depths up to 1,679 feet.

Prof. Prestwich's mean, derived from English and Belgian mines, was 1° Fah. for 49.5 feet. M. Libert does not, however, think that the law of increase of temperature can be correctly expressed as arithmetical progression, but that the rate of increase is greater at greater depths. Taking the results obtained at Flenu with those obtained at the Grand-Buisson colliery in the same field, he concludes that the rate of increase down to depths of 2,263 feet is 1° Fah. for 65 or 69 feet, while for depths from 2,263 feet down to 3,772 feet it is 1° Fah. for 43 feet.

At a bore hole sunk by the Wheeling Development Company, at Wheeling, W. Va., which was 4,500' deep and 4 1/8" in diameter, and which was cased to the depth of 1,570', the strata in nearly as normal condition as possible, and dipping only 50' to the mile, the following results were shown:

The increase of temperature between points 1,350' from the top and 2,236' from the top, which is very nearly M. Libert's intermediate distance, was about 1° per 100'. From a point 2,236' from the top to a point 3,730' from the top the increase in temperature was about 1 1/2° per 100'. From a point 3,730' from the top to the lowest point at which observations were taken, 4,462', the increase was at the rate of 1 3/8° per 100'. In other words, from a point 135' deep to a point 2,236' deep the increase of temperature was about 1° for 100'; from a point 2,236' to a point 3,730' deep the increase was at the rate of 1° for each 77' in depth; and from the point 3,730' deep to the point 4,462' deep the increase was at the rate of 1° for each 58' in depth. The average increase in temperature from the point 1,350' feet from the surface to the point 4,462' from the surface was at the rate of about 1° for each 75' in depth. The average rate of increase of temperature at the Spenburg bore hole, near Berlin, which is 4,170' deep, was at the rate of 1° for each 60' in depth. At the bore hole of Schlada Bach, near Leipsic, which is 5,740' deep, it is at the rate of 1° for each 68' in depth. A comparison of the results found at these different bore holes makes evident the fact that no positive rule for increase of temperature with depth can be adopted.—Colliery Engineer.

#### Collecting Bird Skins.

B. H. Warren, State Zoologist of Pennsylvania, tells in Bulletin No. 6 how to collect, skin, preserve, and mount birds. The collector having, of course, a permit granted by the State in which he lives, starts out after his birds with the best shotgun he can procure. Usually it is a 12 gage, but a 16 or 20 bore is preferable, and he should have shells loaded with shot of a size for anything from a warbler to an eagle. An auxiliary barrel that will shoot a 32 or 38 caliber shot shell is also useful, and a metal tube five or six inches long to fit into the gun barrel the same as a cartridge, loaded with 22 caliber shot shells, is also useful for small birds like the warblers. Smokeless powder is best for the 32, 38, and 22 caliber shells, because it makes little noise to disturb the other birds in the vicinity.

To carry the specimens a good sized fish basket is best, each specimen being wrapped in paper carefully, and great care being taken that the tail feathers are not broken. When several large birds are taken it is best to skin but the body, leaving the wings, legs, and head whole. Of course, under such circumstances, facts about the bird are jotted down in the note book. The note book should be kept in ink, because a pencil mark blurs easily. When a bird is shot, it should be picked up by the legs or bill, unless it is a crippled heron, hawk, or owl. The wounded birds are killed by pressing the heart from either side close to the wings. All wounds and openings are stopped with cotton to prevent the plumage being soiled.

To be of value, each specimen should be labeled with the name, sex, date, and locality, especially in the case of young birds, since an adult can always be identified. The name of the collector, color of the bird's eyes, and contents of its stomach may also be put on the label, besides abbreviations indicating adult (ad.), or immature (g. or yuv.), and the state of plumage, whether nuptial (nupt.) or migratory. "Hornot" means a yearling bird.

The average collector, man or woman, who from a love of nature seeks the fields, will not care to do more than skin the birds, leaving it to some regular taxidermist to mount them. For skinning birds and blowing eggs six instruments are needed, namely, a pair of spring forceps, an egg drill, a cartridge knife, a pair of surgical scissors, a pair of stuffing forceps, and a blowpipe to blow the eggs. Any taxidermist will show how to skin a bird far better than words can describe the process. Once secured, the bird skin is preserved with common salt, if at a distance from the taxidermist, as in a camp, for instance.

The eggs are blown through a single hole in the side, not through the hole in each end, after the usual style with hen's eggs. A small circular hole is drilled through the shell, a small wire is inserted to break up the contents, then the blowpipe is inserted, and, with the hole down, a gentle, steady blowing insures the cleansing of the egg.

#### A New Illuminant.

M. Henry is a French savant of the school of higher studies, who has revealed the power of sulphate of zinc to absorb sunlight and give it back in the dark. Poudre de riz made with this mineral gives a soft luminosity to a fair young face. A lady cyclist dusted all over with this powder is in herself a lamp on a pitch dark night. The luminous pigment is not liable to be spoiled by damp, by carbonic acid or by any weak acid. It resists rain if united to some strongly adhesive body. There is a house in the Rue de Longchamps where a windowless set of rooms is lighted with it. The lady of the house receives there her friends at "five o'clocks." The apartment seemed bathed in moonlight, the curtains are as if studded with glow-worms, the ceiling scintillates. The furniture looks as if rubbed with phosphorus. The play of this light on colored objects gives one the impression of Aladdin's underground palace. Often they take the rich, glowing tones of the topaz, ruby and emerald. This powder does not lose its brilliancy if used in starch or size. A black dress trimmed with lace made luminous by it is more than bewitching.

#### Secondary Battery Plates.

W. J. S. Barber Starkey sends the following interesting note on secondary battery plates to the English Electrical Review:

"I venture to send you a little experience in case it might possibly be of any interest. Last year, when a set of storage cells was being made, the pasted plates, after being dried, were, by mistake, immersed for several hours to harden in a weak solution of sulphuric acid, in which a small quantity of red chromic acid powder had been dissolved. I supposed that the plates would be ruined, but to my surprise they sat harder and more quickly than if they had been immersed in ordinary dilute sulphuric acid, and the plates apparently became deeply peroxidized and assumed a dark brown color. I have since been told that this result would undoubtedly take place. The plates thus treated were then set up in the usual way in the ordinary dilute sulphuric acid battery solution, and are in every way most satisfactory after having been in regular use for some time; you will know whether it is a fact that the red lead in a lead grid turns into peroxide if immersed in a solution of chromic acid."

#### Harvard's Meteorological Stations.

Eight Peruvian meteorological stations are maintained by the Harvard College Observatory. The principal one is at Arequipa, 8,050 feet above the sea and 80 miles from the coast. At Mollendo, on the coast, is another 85 feet above sea level; between Mollendo and Arequipa is another station, La Joya, placed in the center of a rainless, barren district, and 4,140 feet above the sea. The most interesting station is on the summit of the volcano El Misti, 19,200 feet above sea level, and about 10 miles northeast of Arequipa. This is now the highest meteorological station in the world; it is equipped with a meteorograph, devised by Mr. S. P. Fergusson, of the Blue Hill Observatory, Mass., which automatically records temperature, pressure, humidity and wind direction and velocity, and only requires winding once in three months. This obviates the frequent visits from Arequipa once necessary. The other stations are on flank of El Misti, 15,700 feet; at Alto de los Huesos, 13,400 feet; Cuzco, between the Eastern and Western Andes, 16,100 feet; and Santa Ana, east of the Andes, and 3,400 feet above sea level.

#### Langley's Bolometer.

Professor Langley's remarkable instrument known as the bolometer, occupying the entire building of the astro physical observatory attached to the Smithsonian Institution, is pronounced by Rene Bache the most delicate mechanical contrivance ever devised, inasmuch as its "senses" are more acute than those of any human being. Outside of the building a huge machine, the inside works of which are a clockwork mechanism, pumps sunshine through a long tube into a dark room where the bright ray passes through a prism; the latter is not of glass, because glass is opaque to the invisible rays of the solar spectrum, but is of rock salt, carefully cut to a certain angle by the famous optician Brashear, and, though the prism looks almost opaque to the eye, it is as crystal to the invisible rays above the violet and below the red. Thus the operator is able to follow the invisible rays along their dark path, their presence and potency being accurately registered, having for its most essential part a balance composed of a thread of spun glass and a tiny mirror, the latter attached to a piece of a dragon fly's wing.